Zebra *Xi*III*Plus*™ Printers

User's Guide

Customer Order # 11348L
Manufacturer Part # 11348LB Rev. 3

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- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different than that to which the receiver is connected.
- Consult the dealer or an experienced Radio/TV technician for help.

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DECLARATION OF CONFORMITY

I have determined that the Zebra printers identified as the

*Xi*III*Plus*™ Series
90*Xi*III*Plus,* 96*Xi*III*Plus,* 140*Xi*III*Plus,*
170*Xi*III*Plus,* and 220*Xi*III*Plus*

manufactured by:

Zebra Technologies
333 Corporate Woods Parkway
Vernon Hills, Illinois 60061-3109 U.S.A.

have been shown to comply with the applicable technical standards of the FCC

for Home, Office, Commercial, and Industrial use

if no unauthorized change is made in the equipment,
and if the equipment is properly maintained and operated.

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Introduction

Hello!

Thank you for purchasing this high-quality Zebra *Xi*III*Plus* printer, manufactured by the industry leader in quality, service, and value—Zebra Technologies. For over 30 years, Zebra has provided customers with the highest caliber of products and support.

- This manual provides all of the information you need to operate your printer.
- The *ZPL II® Programming Guide Volume I and Volume II* (part # 45540L) shows you how to create the perfect label format for your application. These books also explain how, through ZBI™, you can extend the power of ZPL II by allowing custom programs to be written that operate within the printer and directly interface with bar code scanners and keyboard display devices. In addition, the books contain information about the enhanced operating system features of your printer. There are three ways to obtain these books: on the accessory CD-ROM (supplied with the printer), on our Web site (www.zebra.com), or as printed manuals that can be ordered from your distributor.
- The *ZebraNet® Networking: PrintServer II™ Installation and User's Guide* (part # 45537L) explains how you can quickly set up your printer on an IP network and experience ZebraLink™, our revolutionary real-time connectivity and control solution for Zebra printers (optional ZebraNet® PrintServer II required).
- The *ZebraNet® Wireless Card Socket Installation and User's Guide* (part # 48622L) provides detailed information on Zebra's wireless Ethernet solution for the *Xi*III*Plus* printers.
- The *Maintenance Manual* (part # 48152L) contains the information you need to maintain your printer.

Unpacking and Inspection

Carefully unpack and inspect the printer for possible damage incurred during shipment.

- Check all exterior surfaces.
- Raise the media access door and inspect the media compartment.

In case shipping is required, save the carton and all packing material. Contact your authorized Zebra reseller for instructions.

Reporting Damage

If you discover shipping damage:

- Immediately notify the shipping company and file a damage report with them. *Zebra Technologies is not responsible for any damage incurred during shipment of the equipment and will not repair this damage under warranty.*
- Keep the carton and all packing material for inspection.
- Notify your authorized Zebra reseller.

Storage

If you are not placing the printer into operation immediately, repackage it using the original packing materials. The printer may be stored under the following conditions:

- Temperature: –40° to 140° F (–40° to 60° C)
- Relative humidity: 5% to 85% non-condensing

Media and Ribbon Requirements

Since print quality is affected by media and ribbon, printing speeds, and printer operating modes, it is very important to run tests for your applications.

We STRONGLY RECOMMEND the use of Zebra Technologies-brand supplies for continuous high-quality printing. A wide range of paper, polypropylene, polyester, and vinyl stock has been specifically engineered to enhance the printing capabilities of the printer and to ensure against premature printhead wear.

- Continuous roll media, fanfold media, or card stock with optional perforations and registration holes may be used.
- Printhead life may be reduced by the abrasion of exposed paper fibers when using perforated media.
- The ribbon MUST be as wide as or wider than the media being used. If the ribbon is narrower than the media, areas of the printhead are unprotected and subject to premature wear. (When printing in direct thermal mode, ribbon is not used and should not be loaded in the printer.)

Power Cord

WARNING: For personnel and equipment safety, always use a three-prong plug with an earth-ground connection to the AC power source.

NOTE: Depending on how your printer was ordered, a power cord may or may not be included. If one is not included, or if the one included is not suitable for your requirements, refer to “Power Cord Specifications” on page 98.

The power cord connector must be plugged into the mating connector on the rear of the printer before it is connected to a live power source.

Make sure that the POWER switch (located at the back of the printer) is in the OFF position before connecting the power cable to an electrical outlet.

Printer Anatomy 101

Figure 1 outlines the basic components of your printer. However, depending on the options you have selected, your printer may look slightly different.

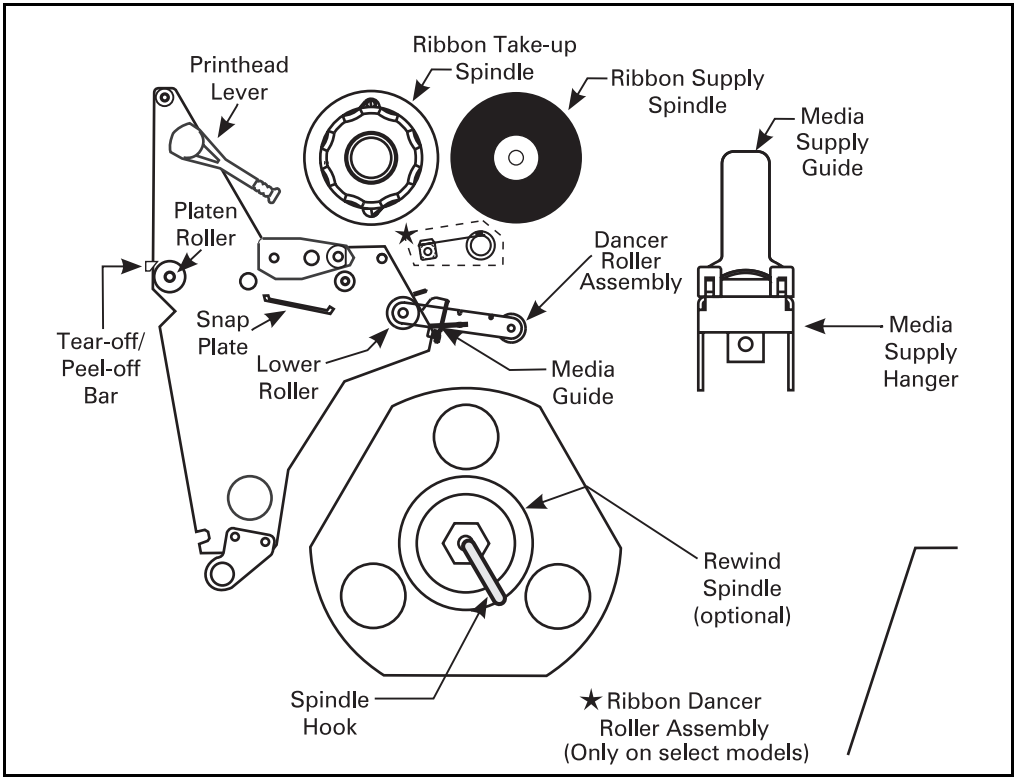


Figure 1. Printer Anatomy Overview

Calibrating the Printer

This chapter of the User's Guide is *so* important that we've printed it on a different color paper! This way, it is easy for you to find when you must calibrate (set up) the printer for your particular application.

Purpose

- To calibrate the printer.
- To verify that the printer is properly set up by printing a test label.

NOTE: This procedure *must* be performed when the printer is first installed or if it does not properly detect the top of the label.

To calibrate the printer, you must perform the following procedures:

- Determine the **type of media** (labels) being used.
- Choose the **print method**.
- Position the **media sensors** (if necessary).
- **Configure the printer and software or driver** based on the label being used.
- Perform a **media and ribbon calibration**.
- Print a **test label.**

Types of Media

Non-Continuous Web Media

Non-continuous web media (refer to Figure 2) refers to individual labels that are separated by a gap, notch, or hole. When you look at the media, you can tell where one label ends and the next one begins.

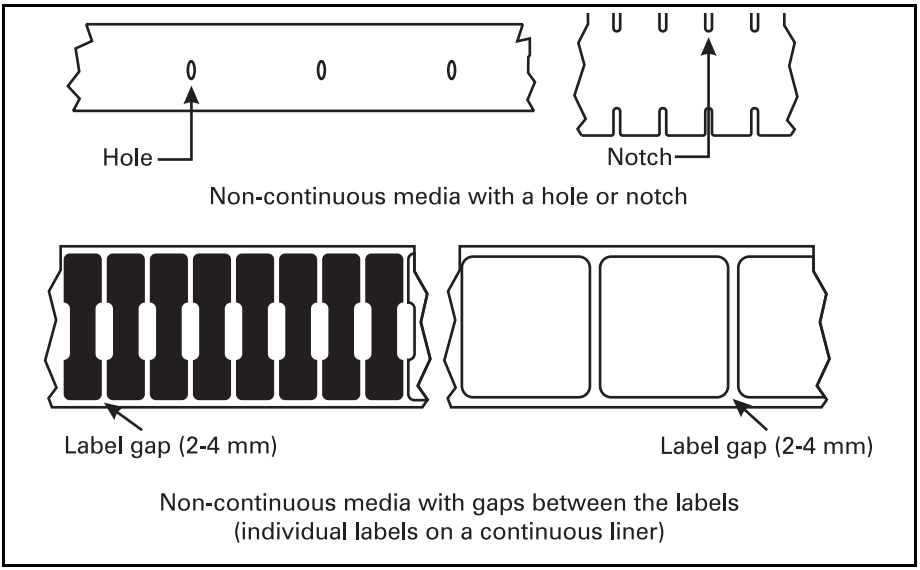

Hole
Notch
Non-continuous media with a hole or notch
Label gap (2-4 mm)
Label gap (2-4 mm)
Non-continuous media with gaps between the labels
(individual labels on a continuous liner)

Figure 2. Non-Continuous Web Media

Non-Continuous Black Mark Media

Non-continuous black mark media has black marks printed on the back that indicate the start and end of each label (refer to Figure 3).

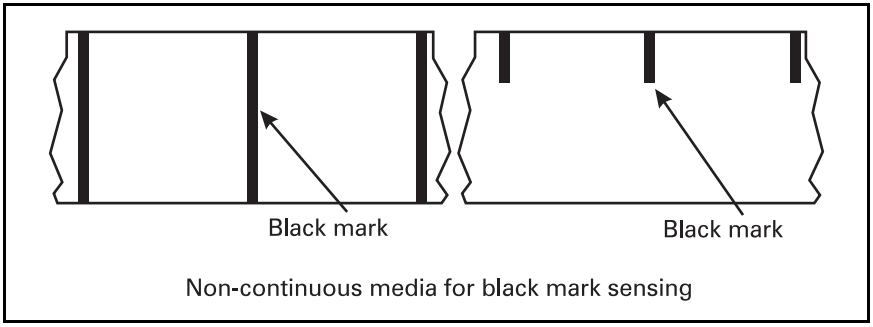


Figure 3. Non-Continuous Black Mark Media

Continuous Media

Continuous media (refer to Figure 4) is one uninterrupted roll of material that allows the image to be printed anywhere on the label.

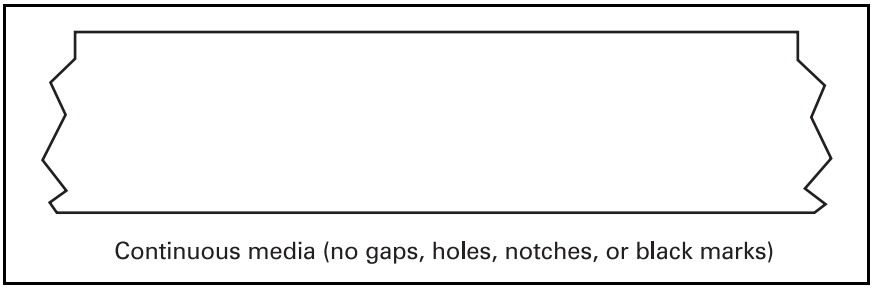


Figure 4. Continuous Media

Choosing the Print Mode

- In **Tear-Off** mode, each label (or a strip of labels) can be torn off after it is printed.
- In **Peel-Off** mode, liner (backing) is peeled away from the label as it is printed. After this label is removed from the printer, the next one is printed.
- In **Cutter** mode, the printer automatically cuts the label after a specified number of labels has been printed.
- In **Rewind** mode, the media and liner are rewound onto a core as the labels are printed.

Loading the Media

Figure 5 illustrates one method of media loading. For more detailed instructions, as well as information about how to load the different types of media and the various printing modes, refer to the instructions that begin on page 29.

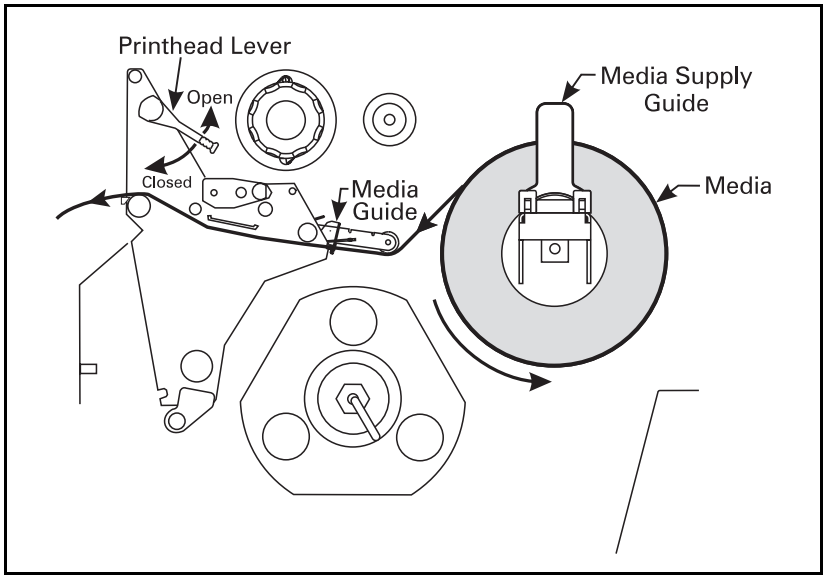


Figure 5. Media Loading

Positioning the Media Sensors

The correct positioning of the media sensors is important—it can make the difference between a perfect label and a call to Technical Support!

Transmissive Sensor

The web or gap sensor, better known as the “transmissive sensor,” detects the gap between labels.

The transmissive sensor actually consists of two sections: a light source (the lower media sensor) and a light sensor (the upper media sensor). The media passes between the two.

The upper media sensor must be positioned:

- Directly over the hole or notch, or
- Anywhere along the width of the media if there is a gap between labels.

NOTE: If you are using continuous media, position the upper media sensor over the media so that the printer can detect an out-of-paper condition.

Adjusting the Upper Media Sensor

Refer to Figure 6. (For clarity, not all printer parts are shown.)

1. Remove the ribbon (if it is installed).
2. Locate the upper media sensor. The upper media sensor "eye" is directly below the adjustment screw head.
3. Slightly loosen the upper media sensor adjustment screw (use a Phillips-head screwdriver).
4. Using the tip of the screwdriver, slide the upper sensor along the slot to the desired position.
5. Tighten the adjustment screw to secure the upper media sensor.

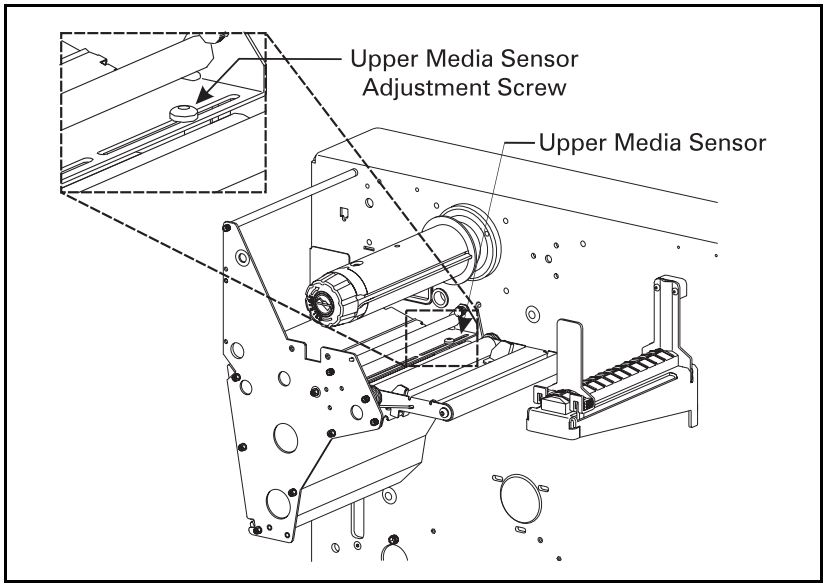


Figure 6. Upper Media Sensor Adjustment

Adjusting the Lower Media Sensor

Position the lower media sensor (refer to Figure 7) by sliding it in its slot until it is positioned directly under the upper media sensor.

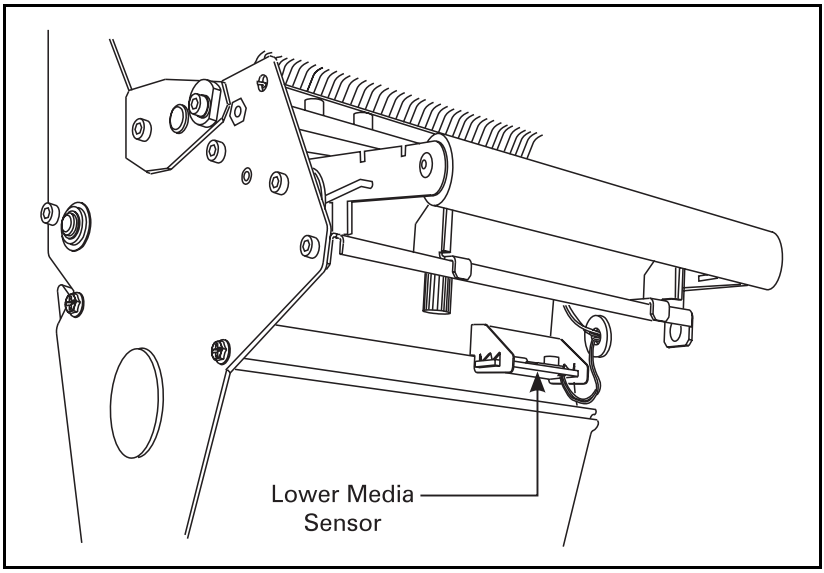


Figure 7. Lower Media Sensor Adjustment

Black Mark Sensor

The black mark sensor is in a fixed position and enabled via the front panel (refer to “Configuring the Printer” on page 15 for details).

Loading the Ribbon

To load the ribbon, refer to Figure 8 (for the 90*Xi*III*Plus*, 96*Xi*III*Plus*, and 140*Xi*III*Plus*) and Figure 9 (for the 170*Xi*III*Plus* and 220*Xi*III*Plus*). For more detailed information, refer to the instructions that begin on page 39.

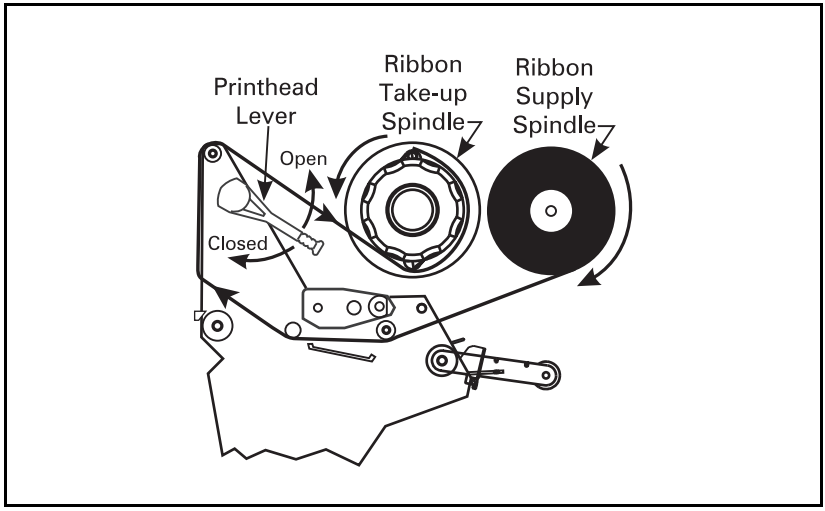


Figure 8. Ribbon Loading (90/96/140*Xi*III*Plus*)

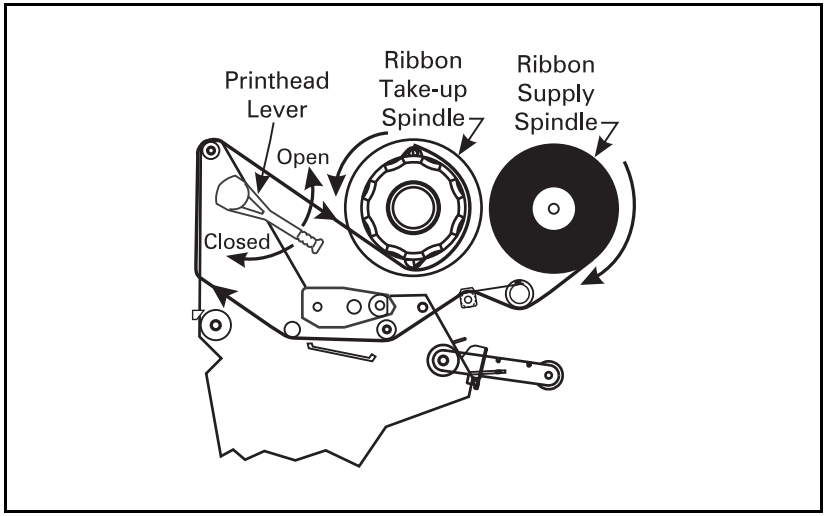


Figure 9. Ribbon Loading (170/220*Xi*III*Plus*)

Operator Controls

POWER Switch

The POWER switch is located at the back of the printer above the power cord and fuse. Turn the printer ON.

Front Panel

The step-by-step instructions in this section tell you which keys to press and what appears on the liquid crystal display (LCD) during the calibration procedure.

For a more detailed explanation of the front panel keys and lights (as shown in Figure 10), refer to the instructions that begin on page 26.

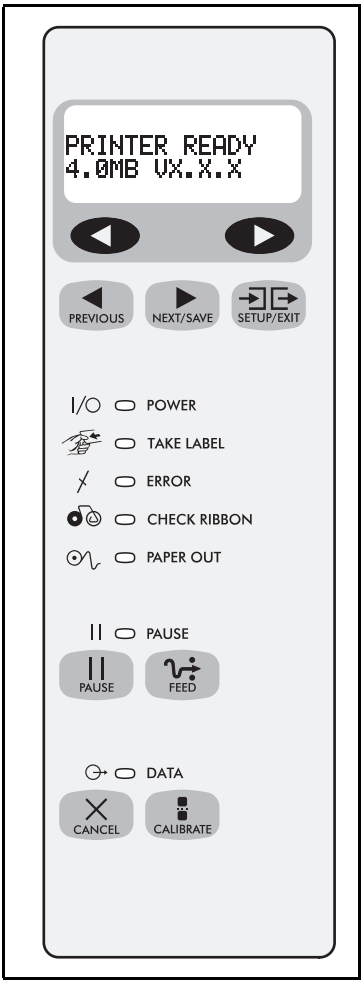


Figure 10. Front Panel

Configuring the Printer

The configuration procedure in the next table contains the information you need to get your printer up and running, *but it is not comprehensive*. Refer to page 43 for more information.

- Enter the configuration mode by pressing the SETUP/EXIT key at the "PRINTER READY" display.

NOTE: You need to press the NEXT/SAVE key more than once to advance to some of the displays.

- Use the RIGHT BLACK OVAL key to increase the value, answer "yes," indicate "on," or move to the next selection.
- Use the LEFT BLACK OVAL key to decrease the value, answer "no," indicate "off," or return to the previous selection.

NOTE: When changing parameters, an asterisk (*) in the upper left-hand corner of the LCD indicates that you have changed this setting from what is currently stored in memory.

Press	LCD Shows	Action/Explanation
—	PRINTER READY	Normal printer operation.
	DARKNESS	Press the BLACK OVAL keys to increase or decrease the print darkness setting. (You may need to change this setting when you print your label.)
	PRINT SPEED	Press the BLACK OVAL keys to select the appropriate print speed for your specific printer.
	PRINT MODE	Press the BLACK OVAL keys to select tear-off, peel-off, cutter, or rewind mode.
	MEDIA TYPE	Press the BLACK OVAL keys to select continuous or non-continuous media type. (If you choose continuous media, you must also include a label length instruction in your label format.)
	SENSOR TYPE	Press the BLACK OVAL keys to select transmissive or black mark sensing mode. Unless your media has black marks on the back, leave your printer at the default setting (web).
	PRINT METHOD	Press the BLACK OVAL keys to select thermal transfer (if you are using ribbon) or direct thermal (no ribbon).
	MAXIMUM LENGTH	Press the BLACK OVAL keys to set the value that is closest to, but not less than, the length of the label you are using.
	SAVE CHANGES	Press the BLACK OVAL keys to select: PERMANENT—saves changes when power is turned off. Press SETUP/EXIT to accept the selection.
—	PRINTER READY	You have exited the configuration mode and are now ready to calibrate the printer.

Configuring the Software or Printer Driver

Many printer settings may also be controlled by your printer's driver or label preparation software. Please refer to the driver or software documentation for more information.

Media and Ribbon Calibration

The default setting for media and ribbon calibration is autocalibrate. If autocalibration is successful, you do not need to perform the following procedure.

NOTE: All steps *must* be performed in the following procedure, even if only one sensor needs to be adjusted.

1. Press the SETUP/EXIT key.
2. Press the NEXT/SAVE key until "MEDIA AND RIBBON CALIBRATE" displays.
3. To start the calibration procedure, press the RIGHT BLACK OVAL key. "LOAD BACKING CANCEL CONTINUE" displays.
4. Open the printhead. Remove approximately 8″ (200 mm) of labels from the liner (backing), so that only the liner is threaded between the media sensors when the media is loaded (refer to Figure 11).

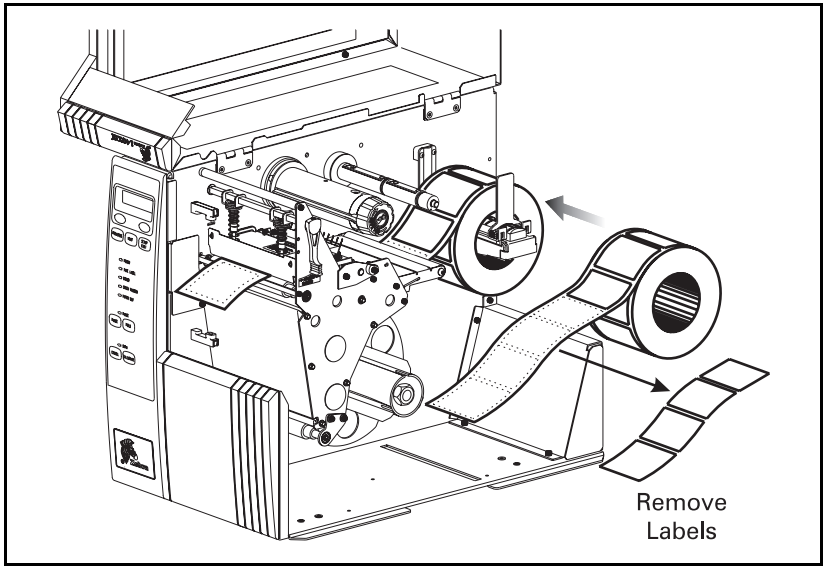


Figure 11. Media and Ribbon Calibration

5. Press the RIGHT BLACK OVAL key. The LCD shows “REMOVE RIBBON CANCEL CONTINUE.”
6. Either remove the ribbon or slide it as far from the printer frame as possible.
7. Close the printhead.
8. Press the RIGHT BLACK OVAL key. The LCD shows “CALIBRATING PLEASE WAIT.”
9. When this part of the calibration process is completed, the LCD reads “RELOAD ALL CONTINUE.”
10. Open the printhead. Pull the liner until a label is positioned between the media sensors.
11. Either load the ribbon or return the ribbon to its proper position.
12. Close the printhead. Press the RIGHT BLACK OVAL key to perform the next part of the calibration sequence. “MEDIA AND RIBBON CALIBRATE” displays. The printer is calibrated when the media stops feeding.
13. Press the SETUP/EXIT key to leave the setup mode. Choose “permanent” when “SAVE CHANGES” displays.

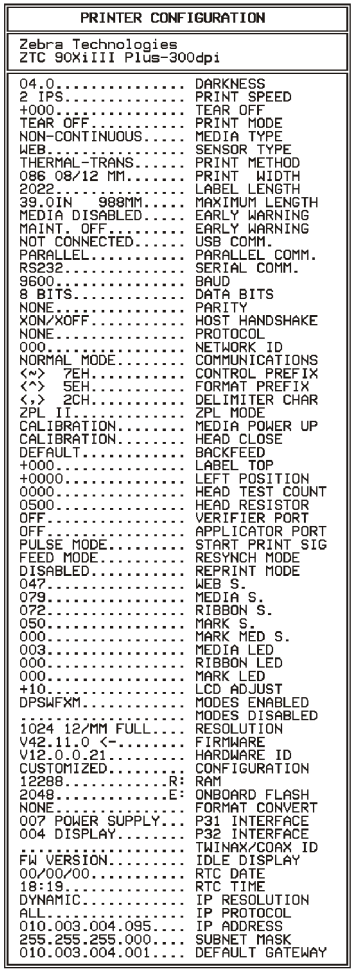
Printing a Test Label

To print a test label:

1. Turn off the printer.
2. Press and hold the CANCEL key while turning on the printer.

A configuration label prints showing the parameters currently stored in the printer's memory (see Figure 12 for a sample label).

If you encounter problems while you are configuring or calibrating the printer or printing a test label, refer to "Troubleshooting" beginning on page 81. Otherwise, refer to "Establishing Communication" beginning on page 21 to set up the communication parameters.


PRINTER CONFIGURATION

Zebra Technologies
ZTC 90XiIII Plus-300dpi

04.0	DARKNESS
2 IPS	PRINT SPEED
+000	TEAR OFF
TEAR OFF	PRINT MODE
NON-CONTINUOUS	MEDIA TYPE
WEB	SENSOR TYPE
THERMAL-TRANS	PRINT METHOD
086 08/12 MM	PRINT WIDTH
2022	LABEL LENGTH
39.0IN 988MM	MAXIMUM LENGTH
MEDIA DISABLED	EARLY WARNING
MAINT. OFF	EARLY WARNING
NOT CONNECTED	USB COMM.
PARALLEL	PARALLEL COMM.
RS232	SERIAL COMM.
9600	BAUD
8 BITS	DATA BITS
NONE	PARITY
XON/XOFF	HOST HANDSHAKE
NONE	PROTOCOL
000	NETWORK ID
NORMAL MODE	COMMUNICATIONS
<~> 7EH	CONTROL PREFIX
<^> 5EH	FORMAT PREFIX
<,> 2CH	DELIMITER CHAR
ZPL II	ZPL MODE
CALIBRATION	MEDIA POWER UP
CALIBRATION	HEAD CLOSE
DEFAULT	BACKFEED
+000	LABEL TOP
+0000	LEFT POSITION
0000	HEAD TEST COUNT
0500	HEAD RESISTOR
OFF	VERIFIER PORT
OFF	APPLICATOR PORT
PULSE MODE	START PRINT SIG
FEED MODE	RESYNCH MODE
DISABLED	REPRINT MODE
047	WEB S.
079	MEDIA S.
072	RIBBON S.
050	MARK S.
000	MARK MED S.
003	MEDIA LED
000	RIBBON LED
000	MARK LED
+10	LCD ADJUST
DPSWFXM	MODES ENABLED
	MODES DISABLED
1024 12/MM FULL	RESOLUTION
V42.11.0 <-	FIRMWARE
V12.0.0.21	HARDWARE ID
CUSTOMIZED	CONFIGURATION
12288 R:	RAM
2048 E:	ONBOARD FLASH
NONE	FORMAT CONVERT
007 POWER SUPPLY	P31 INTERFACE
004 DISPLAY	P32 INTERFACE
	TWINAX/COAX ID
FW VERSION	IDLE DISPLAY
00/00/00	RTC DATE
18:19	RTC TIME
DYNAMIC	IP RESOLUTION
ALL	IP PROTOCOL
010.003.004.095	IP ADDRESS
255.255.255.000	SUBNET MASK
010.003.004.001	DEFAULT GATEWAY

Figure 12. Configuration Label

Establishing Communication

System Considerations

Interfaces

The method of interfacing this printer to a data source depends on the communication options installed in the printer. The standard interfaces are an RS-232 serial data port, a bi-directional parallel port, and a USB 2.0 port. The optional ZebraNet® PrintServer II enables the printer to be connected to 10Base-T Ethernet networks, and a Wireless Card Socket option is available as well. In addition, the IBM® Twinax or IBM® Coax option is available for those applications that require them.

NOTE: RS-422 and RS-485 serial data ports are available through an adapter. A DB-25 cable and a USB 2.0 cable are also available.

Data Specifications

Parallel Data Port

Refer to Figure 13. When communicating via the parallel port, refer to page 54 to configure the communication parameters for the printer. The values selected must be the same as those used by the host equipment connected to the printer.

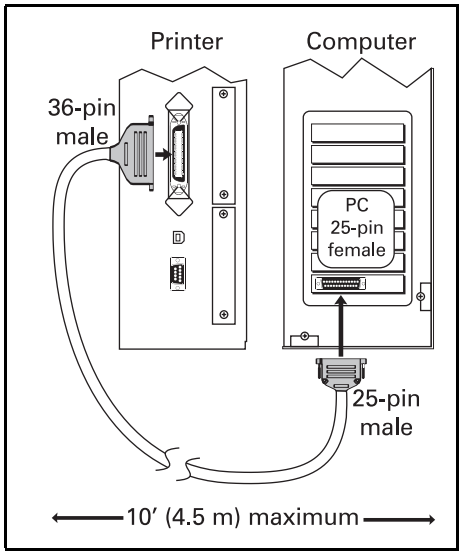


Figure 13. Parallel Data Port

Serial Data Port

When communicating via an asynchronous serial data port (refer to Figure 14), the baud rate, number of data, parity, and handshaking are user-selectable. Parity applies only to data transmitted by the printer because the parity of received data is ignored.

For parallel and serial pinout and technical information, refer to "Appendix" beginning on page 99.

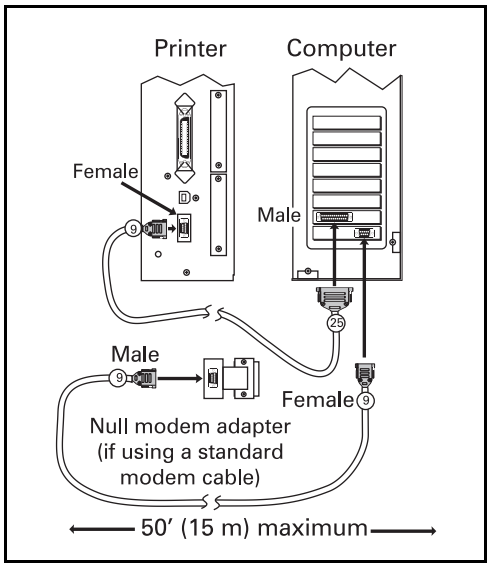


Figure 14. Serial Data Port

USB 2.0 Port

In addition to serial and parallel data ports, a USB 2.0 port (which is USB 1.1 and 1.0 compatible) is available to connect your printer to the host equipment. The industry standard USB cable has an A-male connector on one end and a B-male connector on the other end (see Figure 15). Zebra recommends using a USB 2.0-certified compliant cable that is a maximum of 5 m in length (Zebra part # 33011).

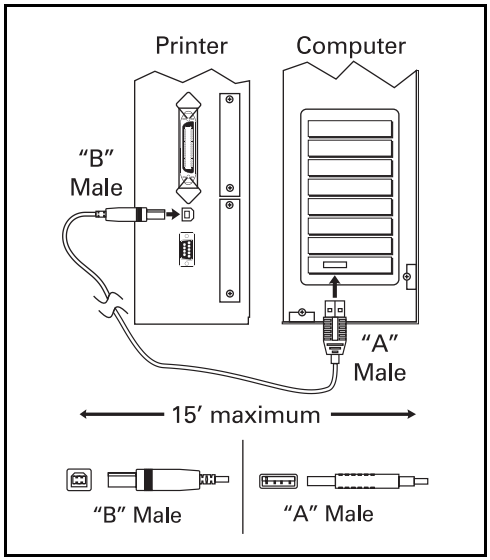


Figure 15. USB Port

Cabling Requirements

Data cables must be fully shielded and fitted with metal or metalized connector shells. Shielded cables and connectors are required to prevent radiation and reception of electrical noise.

To minimize electrical noise pickup in the cable:

- Keep data cables as short as possible.
- Do not bundle the data cables tightly with the power cords.
- Do not tie the data cables to power wire conduits.

NOTE: Zebra printers comply with FCC "Rules and Regulations," Part 15, Subpart J, for Class A Equipment, using fully shielded 6′ (2 m) data cables. Use of longer cables or unshielded cables may increase radiated emissions above the Class A limits.

NOTE: RS-422 and RS-485 applications should use twisted shielded pairs as recommended in the Appendix of the TIA/EIA.-485 Specification.

Operator Controls

This section discusses the functions of the various controls and indicators on the printer. Become familiar with each of these functions before operating the printer.

POWER Switch

This switch is located at the back of the printer above the power cord and fuse. The POWER switch should be turned off before connecting or disconnecting any cables.

External influences, such as lightning storms or noise on the power or data cables, may cause erratic printer behavior. Turning the printer's power off and then back on may re-establish proper printer operation.

Front Panel Display

The front panel display or LCD (as shown in Figure 16) communicates operational status and setup modes and parameters.

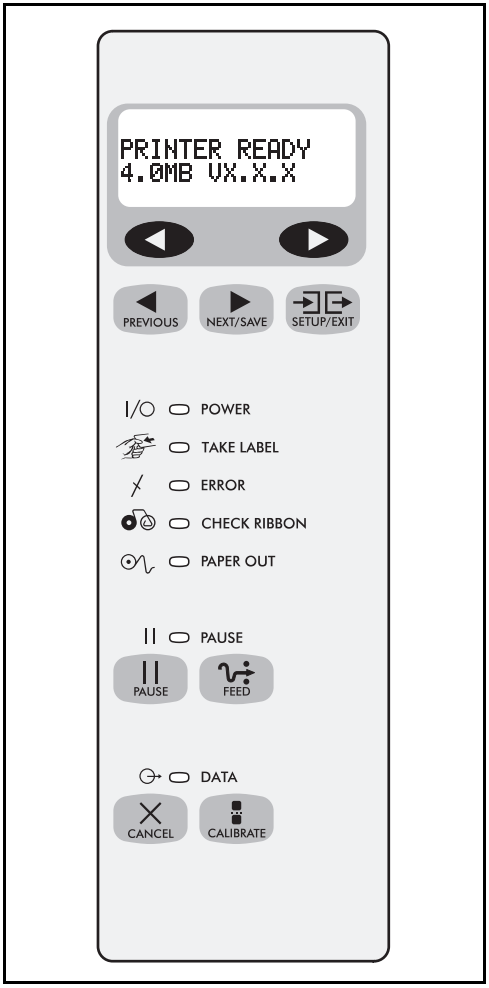
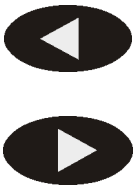


Figure 16. Front Panel

Front Panel Keys

Key	Function
	Starts and stops the printing process. • If the printer is not printing: no printing can occur. • If the printer is printing: printing stops once the current label is complete. Press to remove error messages from the LCD. **NOTE:** Pause mode can also be activated via ZPL II (**~PP, ^PP**).
	Forces the printer to feed one blank label each time the key is pressed. • Printer not printing: one blank label immediately feeds. • Printing: one blank label feeds after the current batch of labels is complete. **NOTE:** Equivalent to the Slew to Home Position (**~PH, ^PH**) ZPL II instruction.
	When in the pause mode, this key cancels print jobs. • Print job in queue: press once for each print job to be deleted. • Press and hold for several seconds to cancel all print jobs in the printer's memory. The DATA light turns off.
	When in the pause mode, this key calibrates the printer for: • Media length. • Media type (continuous or non-continuous). • Print mode (direct thermal or thermal transfer). • Sensor values.
NOTE: The keys below are used only when configuring the printer. Specific uses of these keys are explained in "Configuration" beginning on page 43.	
	• Scrolls to the previous parameter. • Press *and hold* to go backward quickly through parameter sets.
	• Scrolls to the next parameter. (Saves any changes you've made in the configuration and calibration sequence.) • Press *and hold* to advance quickly through parameter sets.
	Enters and exits the setup mode.
	These keys change the parameter values. They are used in different ways depending on the parameter displayed. Common uses are to increase/decrease a value; answer "yes" or "no"; indicate "on" or "off"; scroll through several choices; input the password; or set up the printer for a firmware download.

Front Panel Lights

NOTE: If two operating conditions occur simultaneously (for example, one that causes a light to be on constantly and one that causes the same light to flash), the light flashes.

Light	Status	Indication
POWER	Off	The printer is off or power is not applied.
	On	The printer is on.
TAKE LABEL	Off	Normal operation.
	Flashing	(Peel-Off mode only.) The label is available. Printing is paused until the label is removed.
ERROR	Off	Normal operation—no printer errors.
	Flashing	A printer error exists. Check the LCD for more information.
CHECK RIBBON	Off	Normal operation—ribbon (if used) is properly loaded.
	On	Printing is paused, the LCD shows a warning message, and the PAUSE light is on. • If the printer is in direct thermal mode: ribbon is loaded and should not be. • If the printer is in thermal transfer mode: no ribbon is loaded or the ribbon has run out.
PAPER OUT	Off	Normal operation—media is properly loaded.
	On	No media is under the media sensor. Printing is paused, the LCD shows an error message, and the PAUSE light is on.
PAUSE	Off	Normal operation.
	On	The printer has stopped all printing operations. Either the PAUSE key was pressed, a pause command was included in the label format, the on-line verifier detected an error, or a printer error was detected. Refer to the LCD for more information.
DATA	Off	Normal operation. No data being received or processed.
	On	Data processing or printing is taking place. No data is being received.
	Flashing	The printer is receiving data from *or* sending status information to the host computer. Flashing slows when the printer cannot accept more data, but returns to normal once data is again being received.

Roll Media Loading

NOTE: A calibration must be performed when media and ribbon (if used) are first installed in the printer, or when media or ribbon is changed to a different type. The printer default is autocalibration, which is performed when the printer is first powered up and after the printhead has been closed. If autocalibration fails, then you need to calibrate the printer manually (see page 17 for details).

Tear-Off Mode

Refer to Figure 17.

1. Open the printhead.
2. Slide the media guide and media supply guide as far from the printer frame as possible. Flip down the media supply guide.
3. Load media as shown.
4. Flip up the media supply guide. Slide in the media guide and media supply guide so they just touch, but don't restrict, the edge of the roll.
5. Close the printhead.

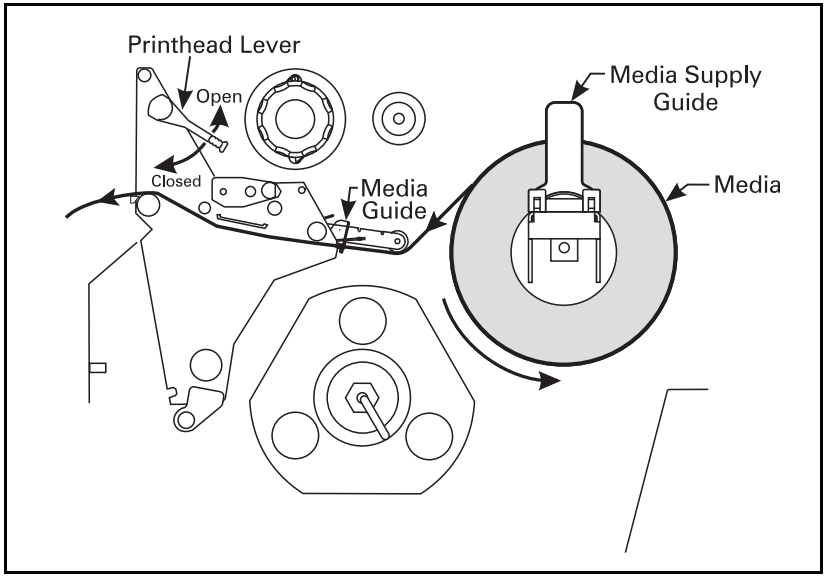


Figure 17. Media Loading—Tear-Off Mode

Peel-Off Mode

Refer to Figure 18.

1. Remove the rewind plate from the front of the printer (if installed). Store it on the two mounting screws on the inside of the front panel.
2. Open the printhead.
3. Slide the media guide and media supply guide as far from the printer frame as possible. Flip down the media supply guide.
4. Load media as shown.
5. When loading media, allow approximately 36″ (915 mm) of media to extend past the tear-off/peel-off bar. Remove all labels from this portion to create a leader.
6. Remove the hook from the rewind spindle. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.
7. Wind the label liner around either the 3″ (76 mm) core *or* the rewind spindle and reinstall the hook.
8. Flip up the media supply guide. Slide in the media guide and media supply guide so they just touch, but don't restrict, the edge of the roll.

Before closing the printhead, make sure:

- The media is positioned against the inside guides.
- The media is taut and parallel with itself and the pathway when wound onto the rewind spindle/core.

9. Close the printhead.
10. To remove the label liner from the rewind spindle, refer to the instructions on page 38.

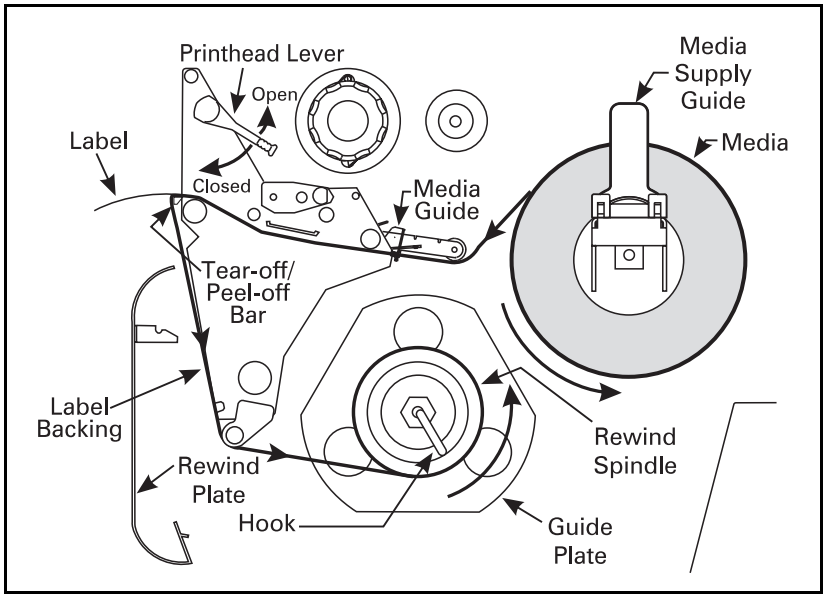


Figure 18. Media Loading—Peel-Off Mode

Rewind Mode (for Printers without the Cutter Option)

(Rewind option required.)

Refer to Figure 19.

1. Remove the rewind plate from its storage location in front of the print mechanism inside the media compartment.
2. Invert the rewind plate so that the lip on the attached hook plate points down.
3. Insert the hook plate lip a short distance (½″ or 13 mm) into the lower opening in the side plate.
4. Align the upper end of the rewind plate with the corresponding opening in the side plate. Slide in the rewind plate so that it stops against the printer's main frame.
5. Open the printhead.
6. Slide the media guide and media supply guide as far from the printer frame as possible. Flip down the media supply guide.
7. Load media as shown.
8. When loading media, allow approximately 36″ (915 mm) of media to extend past the printhead. Remove all labels from this portion to create a leader.
9. Remove the hook from the rewind spindle. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.
10. Wind the label liner around either the 3″ (76 mm) core *or* the rewind spindle and reinstall the hook.
11. Flip up the media supply guide. Slide in the media guide and media supply guide so they just touch, but don't restrict, the edge of the roll.

Before closing the printhead, make sure:

- The media is positioned against the inside guides.
- The media is taut and parallel with itself and the pathway when wound onto the rewind spindle/core.

12. Close the printhead.

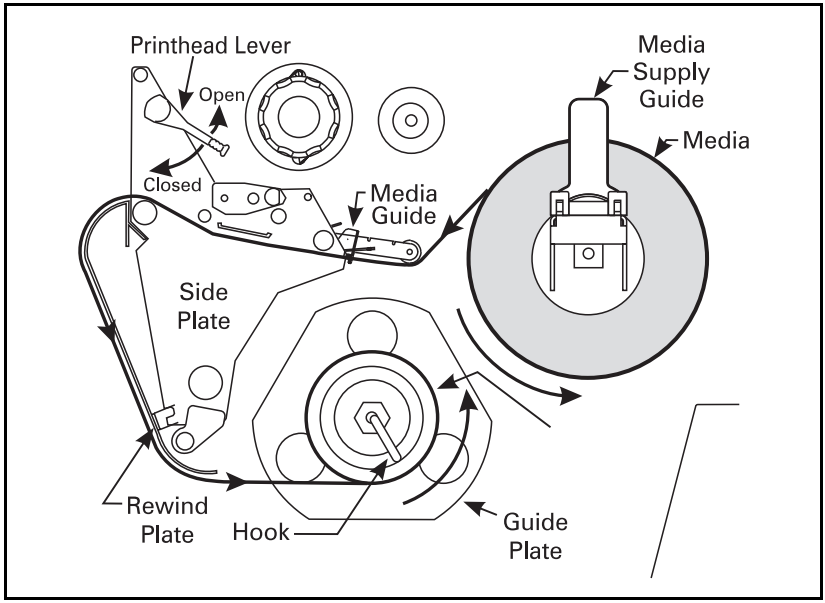


Figure 19. Media Loading—Rewind Mode (without Cutter)

Rewind Mode (for Printers with the Cutter Option)

(Cutter and rewind options required.)

Refer to Figure 20.

1. Remove the rewind plate from its storage location in front of the print mechanism inside the media compartment.
2. Invert the rewind plate so that the lip on the attached hook plate points down.
3. Insert the hook plate lip a short distance (½″ or 13 mm) into the lower opening in the side plate. Slide in the rewind plate so that it stops against the printer's main frame.
4. Insert the two small tabs on the rewind plate into the corresponding slots in the cutter support bracket. (The rewind plate should spring into the proper position.)
5. Open the printhead.
6. Slide the media guide and media supply guide as far from the printer frame as possible. Flip down the media supply guide.
7. Load media as shown.
8. When loading media, allow approximately 36″ (915 mm) of media to extend past the printhead. Remove all labels from this portion to create a leader.
9. Remove the hook from the rewind spindle. If you are using a core, slide it onto the rewind spindle until it is flush against the guide plate.
10. Wind the label liner around either the 3″ (76 mm) core or the rewind spindle and reinstall the hook.
11. Flip up the media supply guide. Slide in the media guide and media supply guide so they just touch, but do not restrict, the edge of the roll.

Before closing the printhead, make sure:

- The media is positioned against the inside guides.
- The media is taut and parallel with itself and the pathway when wound onto the rewind spindle/core.

12. Close the printhead.

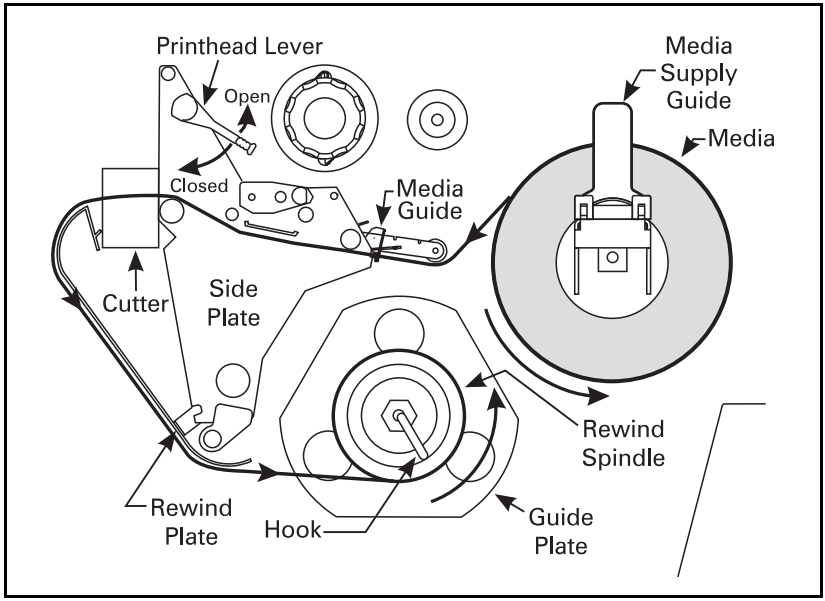


Figure 20. Media Loading—Rewind Mode (with Cutter)

Cutter Mode

(Cutter option required.)

Refer to Figure 21.

1. Open the printhead.
2. Slide the media guide and media supply guide as far from the printer frame as possible. Flip down the media supply guide.
3. Load media as shown.
4. Flip up the media supply guide. Slide in the media guide and media supply guide so they just touch, but do not restrict, the edge of the roll.
5. Close the printhead.

The printer automatically feeds out and cuts one label when the printer is turned on.

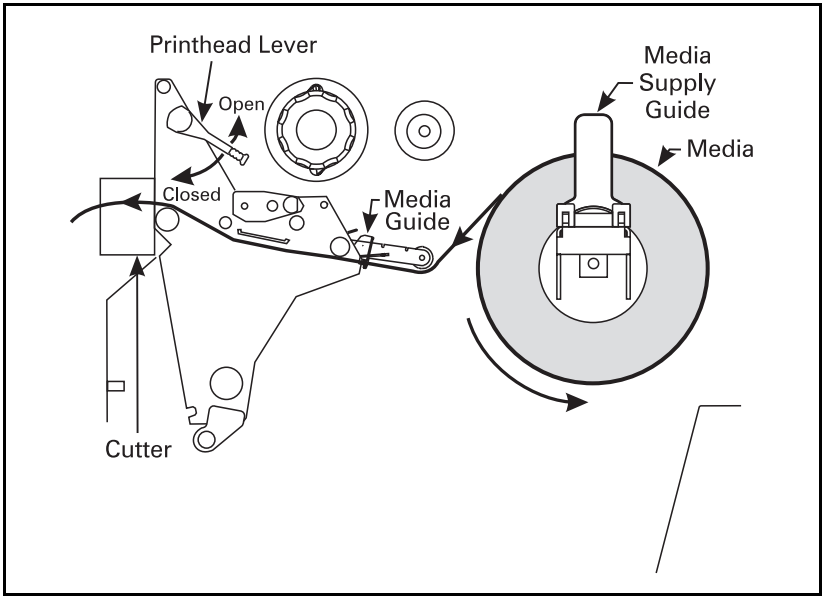


Figure 21. Media Loading—Cutter Mode

Fanfold Media Loading

NOTE: A calibration must be performed when media and ribbon (if used) are first installed in the printer, or when media or ribbon is changed to a different type. The printer default is autocalibration; a manual calibration must be performed if the printer does not autocalibrate (see page 17).

Fanfold media feeds through either the bottom or rear access slot from outside the printer.

Refer to Figure 22 (bottom supply) and Figure 23 (rear supply).

1. Open the printhead.
2. Slide the media guide as far from the printer frame as possible.
3. Load media as shown. If in cutter mode, route media through the cutter.
4. Slide in the media guide so it just touches, but does not restrict, the edge of the roll.
5. Close the printhead.

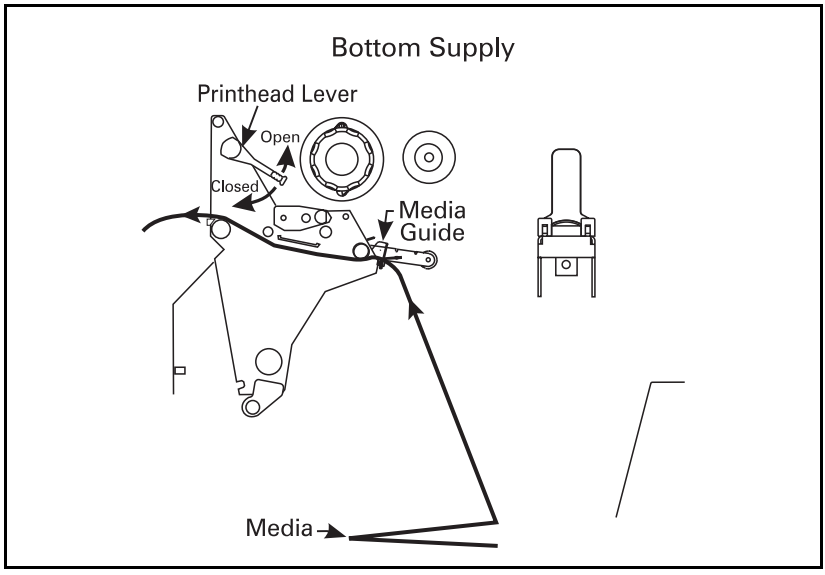


Figure 22. Fanfold Media Loading—Bottom Supply

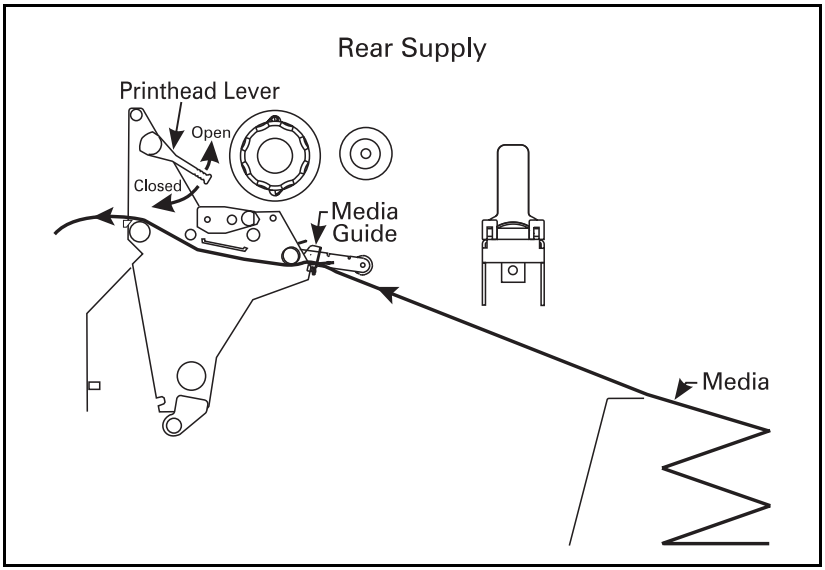


Figure 23. Fanfold Media Loading—Rear Supply

Removing the Label Liner

Zebra recommends that you perform this procedure whenever you change the media.

To remove the liner from the rewind spindle, follow these steps (you do not need to turn off the printer for this procedure):

1. Unwind approximately 36″ (915 mm) of liner from the rewind spindle. Cut it off at the spindle.
2. Pull out the hook. Slide the liner off of the rewind spindle and discard.
3. Wind the media around the rewind spindle once or twice and reinstall the hook. Continue winding to remove any slack in the media.

NOTE: If the media is not exhausted, you must remove it from the rewind spindle, slide the liner off, and then reload the media before completing step 3. Refer to “Roll Media Loading” beginning on page 29 for details.

Ribbon Loading

Figure 24 illustrates the ribbon path for the 90*Xi*III*Plus*, 96*Xi*III*Plus*, and 140*Xi*III*Plus*; Figure 25 illustrates the ribbon path for the 170*Xi*III*Plus* and 220*Xi*III*Plus*. For thermal transfer printing, refer to the appropriate figure and use the following procedure to load the ribbon.

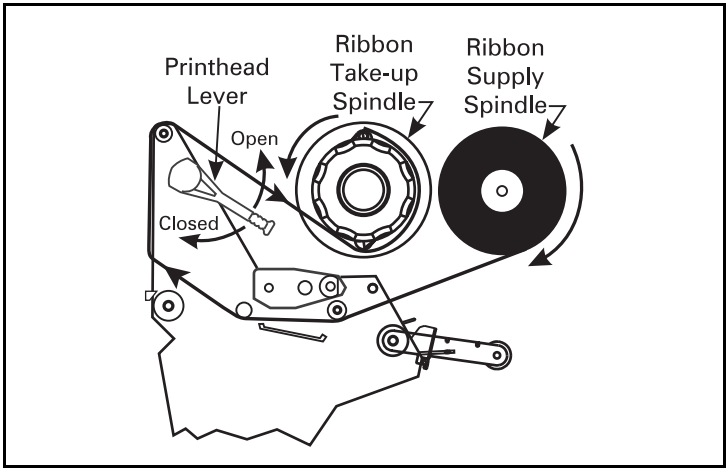


Figure 24. Ribbon Loading (90/96/140*Xi*III*Plus*)

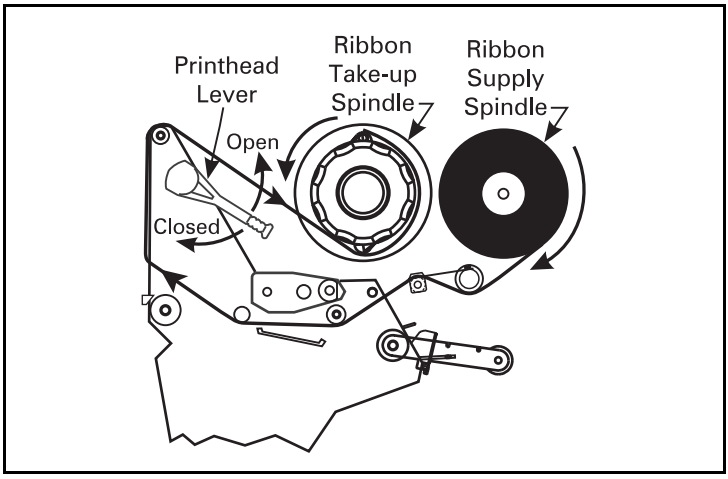


Figure 25. Ribbon Loading (170/220*Xi*III*Plus*)

NOTE: Use ribbon that is ***at least as wide as*** the media. The smooth liner of the ribbon protects the printhead from wear and premature failure due to excessive abrasion. (*For direct thermal print mode, ribbon is not used and should not be loaded in the printer.*)

1. Align the segments of the ribbon supply spindle as shown in Figure 26.
2. Place the ribbon roll on the ribbon supply spindle.

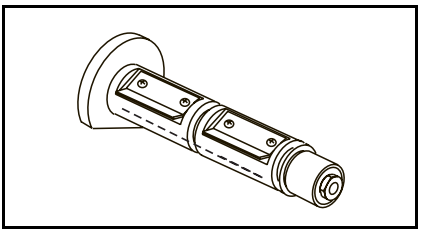


Figure 26. Spindle Alignment

NOTE: Make sure that the core is pushed up against the stop on the ribbon supply spindle and that the ribbon is aligned squarely with its core. If this is not done, the ribbon may not cover the printhead entirely on the inside, exposing print elements to potentially damaging contact with the media.

3. Open the printhead.

NOTE: To make ribbon loading and unloading easier, make a leader for your ribbon roll.

4. See Figure 27. Tear off a strip of media (labels and liner) about 6″–12″ (150 mm–300 mm) long from the roll. Peel off a label from this strip. Apply half of this label to the end of the strip and the other half to the end of the ribbon. This acts as a ribbon leader.
5. Thread the ribbon as shown without creasing or wrinkling it.

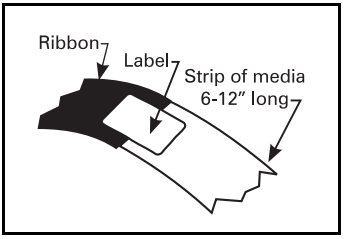


Figure 27. Ribbon Leader

6. Before wrapping the ribbon around the take-up spindle, ensure that the arrow on the knob aligns with the indented notch (see Figure 28 inset).
7. Place the ribbon with the leader around the ribbon take-up spindle and wind counterclockwise for several turns.
8. Close the printhead.

Ribbon Removal

Refer to Figure 28.

1. If the ribbon has not run out, tear or cut the ribbon as close to the ribbon take-up spindle as possible.
2. While holding the ribbon take-up spindle, turn the knob (1) clockwise until it stops. This causes the ribbon release bars (2) to pivot down, easing the spindle's "grip" on the wound ribbon.
3. Slide the ribbon off of the ribbon take-up spindle. Once the spent ribbon has been removed, ensure that the arrow on the knob aligns with the indented notch in the ribbon take-up spindle (see Figure 28 inset).
4. Remove the core from the ribbon supply spindle.
5. Follow the ribbon loading procedure on page 39 to load the new ribbon.

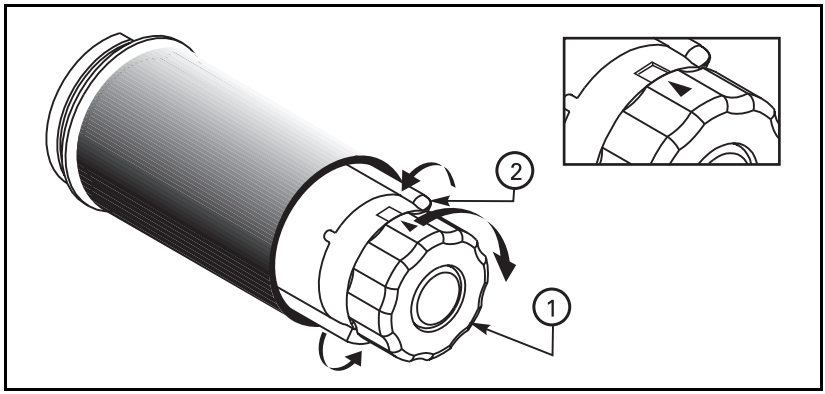


Figure 28. Ribbon Removal

After you have installed the media and ribbon and the Power-On Self Test (POST) is complete, the LCD shows "PRINTER READY." (If the printer fails its POST, refer to page 87.) You may now set printer parameters for your application using the LCD and the five keys directly below it.

NOTE: Printers that are operating on an IP network can be quickly configured via ZebraLink™ WebView (optional ZebraNet® PrintServer II required). For information, refer to *ZebraNet Networking: PrintServer II Installation and User's Guide*.

If it becomes necessary to restore the initial printer defaults, see "FEED Key and PAUSE Key Self Test" on page 91.

NOTE: Unless otherwise noted, all parameters are listed in the order they are displayed, starting with "DARKNESS."

Entering the Setup Mode

To enter the setup mode, press the SETUP/EXIT key. Press either the NEXT/SAVE key or PREVIOUS key to scroll to the parameter you wish to set.

NOTE: You may also press *and hold* the NEXT/SAVE and PREVIOUS keys to advance quickly through the configuration parameters.

Parameters in this section are shown in the order displayed when pressing the NEXT/SAVE key. Throughout this process, press the NEXT/SAVE key to continue to the next parameter, or press the PREVIOUS key to return to the previous parameter in the cycle.

An asterisk (*) in the upper left-hand corner of the LCD indicates that the value displayed is different from the currently stored value.

Changing Password-Protected Parameters

Certain parameters are password-protected by factory default.

CAUTION: Do not change password-protected parameters unless you have a complete understanding of what you are doing! If the parameters are set incorrectly, they could cause the printer to function in an unpredictable way.

The first attempt to change one of these parameters (pressing one of the BLACK OVAL keys) requires you to enter a four-digit password via the "ENTER PASSWORD" display. The LEFT BLACK OVAL key changes the selected digit position; the RIGHT BLACK OVAL key increases the selected digit value. After entering the password, press the NEXT/SAVE key. The parameter you wish to change is displayed. If the password was entered correctly, you can now change the value.

The default password value is 1234. The password can be changed using the **^KP** (Define Password) ZPL II instruction or through ZebraLink™ WebView (optional ZebraNet® PrintServer II required).

NOTE: Once the password has been entered correctly, it does not have to be entered again unless you leave and re-enter the setup mode using the SETUP/EXIT key, or if you power the printer down and then re-enter the setup mode.

NOTE: You can disable the password protection feature so that it no longer prompts you for a password by setting the password to ØØØØ via the **^KPØ** ZPL/ZPL II command. To re-enable the password-protection feature, send the ZPL/ZPL II command **^KPx**, where "x" can be any number, one to four digits in length, except Ø.

Leaving the Setup Mode

You can leave the setup mode at any time by pressing the SETUP/EXIT key. The “SAVE CHANGES” display appears. There are five choices, as described below. Pressing the LEFT or RIGHT BLACK OVAL key displays other choices and pressing the NEXT/SAVE key selects the displayed choice.

- PERMANENT—Permanently saves the changes. Values are stored in the printer even when power is turned off.
- TEMPORARY—Saves the changes until you change them again or until power is turned off.
- CANCEL—Cancels all changes from the time you pressed the SETUP/EXIT key except the darkness and tear-off settings (if they were changed).
- LOAD DEFAULTS—Loads factory defaults. The factory defaults are shown on the following pages.

NOTE: Loading factory defaults causes the printer to autocalibrate.

- LOAD LAST SAVE—Loads values from the last permanent save.

Configuration and Calibration Sequence

Press	LCD Shows	Action/Explanation
—	PRINTER READY	Normal printer operation.
Setting Print Parameters		
	DARKNESS	**Adjusting Print Darkness:** Press the RIGHT BLACK OVAL key to increase darkness, press the LEFT BLACK OVAL key to decrease darkness. **Default:** +10 **Range:** 0 to +30.0 Darkness settings are dependent on a variety of factors, including ribbon type, media, and the condition of the printhead. You may adjust the darkness for consistent high-quality printing. If printing is too light, or if there are voids in printed areas, you should increase the darkness. If printing is too dark, or if there is spreading or bleeding of printed areas, you should decrease the darkness. The FEED Key Self Test on page 90 can also be used to determine the best darkness setting. Since the darkness setting takes effect immediately, you can see the results on labels that are currently printing. **CAUTION:** Set the darkness to the lowest setting that provides good print quality. Darkness set too high may cause ink smearing or burn through the ribbon. Darkness settings also may be changed by the driver or software settings.
	PRINT SPEED	**Adjusting Print Speed:** Press the RIGHT BLACK OVAL key to increase print speed, press the LEFT BLACK OVAL key to decrease print speed. **Default:** 2 ips **Range:** –2 ips to +12 ips (dependent on specific printer) Slower print speeds typically yield better print quality. Print speed changes take effect upon exiting the menu mode.
	TEAR OFF	**Adjusting the Tear-Off Position:** Press the RIGHT BLACK OVAL key to increase the value, press the LEFT BLACK OVAL key to decrease the value. Each press of the key adjusts the tear-off position by four dot rows. **Default:** +0 **Range:** –120 to +120 This parameter establishes the position of the media over the tear-off/peel-off bar after printing.
	PRINT MODE	**Selecting Print Mode:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Tear-off **Selections:** Tear-off, peel-off, cutter, rewind, applicator Print mode settings tell the printer the method of media delivery you wish to use. Be sure to select a print mode that your hardware configuration supports as some of the selections displayed are for optional printer features.

Press	LCD Shows	Action/Explanation
	EARLY WARNING	**Setting Early Warning:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Media disabled, ribbon disabled, maintenance disabled **Selections:** Media disabled, media enabled, ribbon disabled, ribbon enabled, maintenance disabled, maintenance enabled This parameter enables the printer to provide early warnings when labels or ribbons are running low or when the printhead needs to be cleaned. To enable the Early Warning System, press SETUP/EXIT, then press NEXT/SAVE. To select the Early Warning setting, scroll back until Media Enabled is listed on the LCD and press NEXT/SAVE to access the media settings. Use the RIGHT or LEFT BLACK OVAL key to select the setting, then press SETUP/EXIT and NEXT/SAVE to save the setting. Repeat this process to set the early warning for ribbon or maintenance (printhead cleaning). **NOTE:** When setting the early warning for maintenance, an additional setting appears after the media setting that prompts the LCD to ask "HEAD CLEAN." Use the RIGHT BLACK OVAL key to select **"YES"** and then press SETUP/EXIT and NEXT/SAVE to reset the label counter. When the printer detects it is running low with less than 15% of the remaining labels or ribbons, the following message appears on the LCD: "WARNING MEDIA LOW" or 'WARNING RIBBON LOW." If the alert function has been enabled, an alert is also sent. When the printhead is opened and then closed after a media or ribbon warning has been received, the LCD asks "MEDIA REPLACED" or "RIBBON REPLACED." Press the RIGHT BLACK OVAL key "**YES**" to clear the warning and rest the label counter. **NOTE:** Labels per roll and ribbon length need to be updated when beginning use of the Early Warning System. Also, the printer does not make any adjustments when power is turned off and on.
	LABELS PER ROLL	**Setting Labels Per Roll:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** 900 labels **Range:** 100 labels–9999 labels This parameter needs to be updated when setting the Early Warning System so the printer can provide early warnings when labels are running low.
	RIBBON LENGTH	**Setting Ribbon Length:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** 450 m (1476′) **Range:** 100 m–450 m (328′–1476′) This parameter needs to be updated when setting the Early Warning System so the printer can provide early warnings when ribbon is running low.

Press	LCD Shows	Action/Explanation
	MEDIA TYPE	**Setting Media Type:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Continuous **Selections:** Continuous, non-continuous This parameter tells the printer the type of media you are using. Selecting continuous media requires that you include a label length instruction in your label format (**^LLxxxx** if you are using ZPL or ZPL II). When non-continuous media is selected, the printer feeds media to calculate label length (the distance between two recognized registration points of the inter-label gap, webbing, or alignment notch or hole).
	SENSOR TYPE	**Setting the Sensor Type:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Web **Selections:** Web, mark This parameter tells the printer whether you are using media with a web (gap/space between labels, notch, or hole) to indicate the separations between labels or if you are using media with a black mark printed on the back. If your media does not have black marks for registration on the back, leave your printer at the default (web).
	PRINT METHOD	**Selecting Print Method:** Press the RIGHT BLACK OVAL key for the next value, press the LEFT BLACK OVAL key for the previous value. **Default:** Thermal transfer **Selections:** Thermal transfer, direct thermal The print method parameter tells the printer the method of printing you wish to use: direct thermal (no ribbon) or thermal transfer (using thermal transfer media and ribbon). **NOTE:** Selecting direct thermal when using thermal transfer media and ribbon creates a warning condition, but printing continues.

Press	LCD Shows	Action/Explanation
	PRINT WIDTH	**Setting Print Width:** Press the RIGHT BLACK OVAL key to increase the value, press the LEFT BLACK OVAL key to decrease the value. To change the unit of measurement, press the LEFT BLACK OVAL key until the unit of measurement is active, then press the RIGHT BLACK OVAL key to toggle to a different unit of measure (mm, inches, or dots). **Default; Range:** The default and range of acceptable values vary depending on what printer you have. Refer to "Printing Specifications" on page 96 for further information about the ranges available for your model. Print width determines the printable area across the width of the label. **NOTE:** The printer does not accept any value larger than the maximum print width listed on page 96.
	MAXIMUM LENGTH	**Setting Maximum Length:** Press the LEFT BLACK OVAL key to decrease the value, press the RIGHT BLACK OVAL key to increase the value. **Default; Range:** The default and range of acceptable values vary depending on your printer's configuration. Values are adjustable in 1″ (25.4 mm) increments. Maximum length is used in conjunction with the calibration procedure. The value of this setting is the maximum label length that is used during the media portion of the calibration process. Only a few labels are required to set media sensors. Always set the value that is at least 1″ (25.4 mm) longer than the longest label to be used on the printer.

Listing Printer Information		
Press	**LCD Shows**	**Action/Explanation**
	LIST FONTS	**List Fonts:** Press the RIGHT BLACK OVAL key to print a label listing all of the available fonts. This selection is used to print a label that lists all fonts currently available in the printer, including standard printer fonts plus any optional fonts. Fonts may be stored in RAM, FLASH memory, font EPROMs, or font cards.
	LIST BAR CODES	**List Bar Codes:** Press the RIGHT BLACK OVAL key to print a label listing all of the available bar codes. This selection is used to print a label that lists all bar codes currently available in the printer.
	LIST IMAGES	**List Images:** Press the RIGHT BLACK OVAL key to print a label listing all of the available images. This selection is used to print a label that lists all images currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
	LIST FORMATS	**List Formats:** Press the RIGHT BLACK OVAL key to print a label listing all of the available formats. This selection is used to print a label that lists all formats currently stored in the printer's RAM, FLASH memory, optional EPROM, or optional memory card.
	LIST SETUP	**List Setup:** Press the RIGHT BLACK OVAL key to print a label listing the current printer configuration. This selection is used to print a label that lists the current printer configuration information. (Same as the CANCEL Key Self Test on page 88.)
	LIST ALL	**List All:** Press the RIGHT BLACK OVAL key to print a label listing all available fonts, bar codes, images, formats, and the current printer configuration.

Press	LCD Shows	Action/Explanation
	INITIALIZE CARD	**Initialize Memory Card** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the memory card. Press the NEXT/SAVE key to bypass this function. 1. Press the RIGHT BLACK OVAL key to select "**YES.**" If your printer is set to require a password, you are now prompted to enter the password. Enter the password and then press the NEXT/SAVE key. 2. The LCD asks "INITIALIZE CARD." Press the RIGHT BLACK OVAL key "**YES.**" 3. The LCD asks "ARE YOU SURE." 4. Press the RIGHT BLACK OVAL key "**YES**" to begin initialization. *or* Press the LEFT BLACK OVAL key "**NO**" to cancel the request and return to the "INITIALIZE CARD" prompt. 5. Press the SETUP/EXIT key followed by the NEXT/SAVE key. If initialization is still in process, the LCD flashes back and forth between the two phrases "CHECKING B: MEMORY" and "PRINTER IDLE." When initialization is complete, the printer automatically exits the setup mode and the LCD shows "PRINTER READY." **NOTE:** Depending on the amount of memory in the memory card, initialization may take up to five minutes to complete.
	INIT FLASH MEM	**Initialize Flash Memory** **CAUTION:** Perform this operation only when it is necessary to erase all previously stored information from the FLASH memory. Press the NEXT/SAVE key to bypass this function. 1. Press the RIGHT BLACK OVAL key to select "**YES.**" If your printer is set to require a password, you are now prompted to enter the password. Enter the password and then press the NEXT/SAVE key. 2. The LCD asks "INITIALIZE FLASH." Press the RIGHT BLACK OVAL key "**YES.**" 3. The LCD asks "ARE YOU SURE." 4. Press the RIGHT BLACK OVAL key "**YES**" to begin initialization. *or* Press the LEFT BLACK OVAL key "**NO**" to cancel the request and return to the "INITIALIZE FLASH" prompt.

Media and Ribbon Sensor Calibration

NOTE: Before you begin this procedure, make sure that the maximum length is set to a value 1″ (25.4 mm) greater than the length of the labels you are using. If the maximum length is set to a lower value, the calibration process assumes that continuous media is in the printer. See page 49 for more information.

There are two different types of calibration that can be performed by the printer:

1) **Auto Calibration.** When the printer is first powered up and after the printhead has been closed, the printer feeds media and automatically sets the value it detects for media, media liner material (the spaces between labels), and media out. This type of calibration also occurs as part of the sensor profile and media and ribbon calibration procedures.
2) **Media and Ribbon Sensor Sensitivity Calibration.** Performing the media and ribbon calibration procedure first resets the sensitivity of the sensors to detect correctly the media and ribbon you are using. With the sensors at their new sensitivity, the printer then performs the standard calibration. Changing the type of ribbon and/or media may require resetting the sensitivity of the media and ribbon sensors. Indications that the sensitivity may need to be reset would be a CHECK RIBBON light on with the ribbon properly installed or non-continuous media being treated as continuous media.

Press	LCD Shows	Action/Explanation
NEXT/SAVE	SENSOR PROFILE	**Sensor Profile:** Press NEXT/SAVE to skip this standard calibration procedure and continue with the media and ribbon calibration parameter that follows. Press the RIGHT BLACK OVAL key to initiate this standard calibration procedure and print a media sensor profile. See Figure 29. The media sensor profile may be used to troubleshoot registration problems that may be caused when the media sensor detects preprinted areas on the media or experiences difficulty in determining web location. If the sensitivity of the media and/or ribbon sensors MUST be adjusted, use the media and ribbon sensor sensitivity procedure.

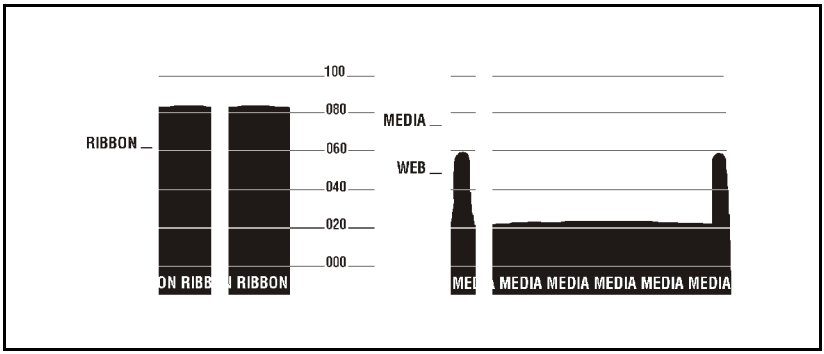


Figure 29. Sensor Profile

Press	LCD Shows	Action/Explanation
	MEDIA AND RIBBON CALIBRATE	**NOTE:** If you use this procedure, turn autocalibration off. **Media and Ribbon Sensor Sensitivity:** Press NEXT/SAVE to skip the calibration procedure and continue with the host port selection parameters that follow. Press the RIGHT BLACK OVAL key to start the calibration procedure. This procedure is used to adjust the sensitivity of the media and ribbon sensors. **NOTE:** The procedure must be followed exactly as presented. All steps must be performed even if only one of the sensors requires adjustment.
Media and Ribbon Calibration Procedure		
	LOAD BACKING	Press the LEFT BLACK OVAL key to cancel the operation, or do the following: 1) Open the printhead. 2) Remove approximately 8″ (203 mm) of labels from the media liner, and pull the media into the printer so that only the liner is between the media sensors. 3) Press the RIGHT BLACK OVAL key to continue.
	REMOVE RIBBON	Press the LEFT BLACK OVAL key to cancel the operation or do the following: 1) Remove the ribbon. 2) Close the printhead. 3) Press the RIGHT BLACK OVAL key to continue.
	CALIBRATING PLEASE WAIT	The printer automatically adjusts the scale (gain) of the signals it receives from the media and ribbon sensors. On the sensor profile, this essentially corresponds to moving the peak of the graph up or down to optimize the readings for your application.
—	RELOAD ALL	When “RELOAD ALL” is displayed: 1) Open the printhead and pull the media forward until a label is positioned under the media sensor. 2) Reload the ribbon back into to its proper position. 3) Close the printhead. 4) Press the RIGHT BLACK OVAL key to continue.
	MEDIA AND RIBBON CALIBRATE	Now that the scale has changed, the printer performs a calibration equivalent to pressing the CALIBRATE key; during this process, the printer determines the label length. The process is now complete! To see the new readings on the new scale, print a sensor profile.

Setting Communication Parameters

Communication parameters must be set correctly for the printer to communicate with the host computer. These parameters ensure that the printer and host computer are "speaking the same language." All communication parameters are password protected.

Press	LCD Shows	Action/Explanation
	PARALLEL COMM	**Setting Parallel Communications:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Parallel **Selections:** Parallel, twinax/coax Select the communications port that matches the one being used by the host computer.
	SERIAL COMM	**Setting Serial Communications:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** RS-232 **Selections:** RS-232, RS-422/485, RS-485 multidrop Select the communications port that matches the one being used by the host computer.
	BAUD	**Setting Baud:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** 9600 **Selections:** 110, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200 The baud setting of the printer must match the baud setting of the host computer for accurate communications to take place. Select the value that matches the one being used by the host computer.
	DATA BITS	**Setting Data Bits:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** 7-bits **Selections:** 7-bits, 8-bits The data bits of the printer must match the data bits of the host computer for accurate communications to take place. Set the data bits to match the setting being used by the host computer. **NOTE:** Must be set to 8 data bits to use Code Page 850.

Press	LCD Shows	Action/Explanation
	PARITY	**Setting Parity:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Even **Selections:** Even, odd, none The parity of the printer must match the parity of the host computer for accurate communications to take place. Select the parity that matches the one being used by the host computer.
	HOST HANDSHAKE	**Setting Host Handshake:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** XON/XOFF **Selections:** XON/XOFF, DTR/DSR The handshake protocol of the printer must match the handshake protocol of the host computer for proper communications to take place. Select the handshake protocol that matches the one being used by the host computer.
	PROTOCOL	**Setting Protocol:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** None **Selections:** None, Zebra, ACK/NACK Protocol is a type of error checking system. Depending on the selection, an indicator may be sent from the printer to the host computer signifying that data has been received. Select the protocol that is requested by the host computer. Further details on protocol can be found in the *ZPL II Programming Guide*. **NOTE:** Zebra is the same as ACK/NACK except that with Zebra the response messages are sequenced. If Zebra is selected, printer must use "DTR/DSR" host handshake protocol.

Press	LCD Shows	Action/Explanation
	NETWORK ID	**Setting Network ID:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. **Default:** 000 **Range:** 000–999 Network ID is used to assign a unique number to a printer used in an RS-422/RS-485 network. This gives the host computer the means to address a specific printer. If the printer is used in an RS-422/RS-485 network, you must select a network ID number. This does not affect TCP/IP or IPX networks.
	COMMUNICATIONS	**Setting Communications Mode:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Normal mode **Selections:** Normal mode, diagnostics The communication diagnostics mode is a troubleshooting tool for checking the interconnection between the printer and the host computer. When “diagnostics” is selected, all data sent from the host computer to the printer is printed as straight ASCII characters, with the hex value below the ASCII text. The printer prints all characters received, including control codes, like CR (carriage return). A sample printout is shown in Figure 39 on page 91. **NOTES** on diagnostic printouts: • FE indicates a framing error. • OE indicates an overrun error. • PE indicates a parity error. • NE indicates noise. For any errors, check that your communication parameters are correct. Set the print width equal to or less than the label width used for the test. See page 49 for more information.

Selecting Prefix and Delimiter Characters

Prefix and delimiter characters are 2-digit hex values used within the ZPL/ZPL II formats sent to the printer. The printer uses the last prefix and delimiter characters sent to it, whether from a ZPL II instruction or from the front panel.

NOTE: DO NOT use the same hex value for the control, format, and delimiter character. The printer must see different characters to function properly.

Press	LCD Shows	Action/Explanation
	CONTROL PREFIX	**Control Prefix Character:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. **Default:** 7E (tilde—displayed as a black square) **Range:** 00–FF The printer looks for this 2-digit hex character to indicate the start of a ZPL/ZPL II control instruction.
	FORMAT PREFIX	**Format Prefix Character:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. **Default:** 5E (caret) **Range:** 00–FF The printer looks for this 2-digit hex character to indicate the start of a ZPL/ZPL II format instruction.
	DELIMITER CHAR	**Delimiter Character:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. **Default:** 2C (comma) **Range:** 00–FF The delimiter character is a 2-digit hex value used as a parameter place marker in ZPL/ZPL II format instructions. Refer to the *ZPL II Programming Guide Volume I* for more information.

Selecting ZPL Mode		
Press	**LCD Shows**	**Action/Explanation**
	ZPL MODE	**Selecting ZPL Mode:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** ZPL II **Selections:** ZPL II, ZPL The printer remains in the selected mode until it is changed by this front panel instruction or by using a ZPL/ZPL II command. The printer accepts label formats written in either ZPL or ZPL II. This eliminates the need to rewrite any ZPL formats you already have. Refer to the *ZPL II Programming Guide* for more information on the differences between ZPL and ZPL II.
Power-Up and Head Close Parameters		
	MEDIA POWER UP	**Media Power-Up:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Calibration **Selections:** Feed, calibration, length, and no motion This parameter establishes the action of the media when the printer is turned on. • Calibration: Determines the length of the label. • Length: Used in continuous mode to feed the last stored label length. • No Motion: Media does not move. • Feed: Feeds the label to the first registration point.
	HEAD CLOSE	**Head Close:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Calibration **Selections:** Feed, calibration, length, no motion Determines the action of the media after the printhead has been opened and then closed. • Calibration: Determines the length of the label. • Length: Used in continuous mode to feed the last stored label length. • No Motion: Media does not move. • Feed: Feeds the label to the first registration point.

Label Positioning Parameters		
Press	**LCD Shows**	**Action/Explanation**
	BACKFEED	**Backfeed Sequence:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Default (90%) **Selections:** Default, after, before, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, off This parameter establishes when and how much label backfeed occurs after a label is removed or cut in the peel-off, cutter, and applicator modes. It has no effect in rewind or tear-off modes. This parameter setting can be superseded by the **~JS** instruction when received as part of a label format (refer to the *ZPL II Programming Guide*). **NOTE:** The difference between the value entered and 100% establishes how much backfeed occurs before the next label is printed. For example, a value of 40 means that 40% of the backfeed takes place after the label is removed or cut. The remaining 60% takes place before the next label is printed. A value of "before" means that all backfeed takes place before the next label is printed.
	LABEL TOP	**Adjusting Label Top Position:** Press the RIGHT BLACK OVAL key to increase the value, press the LEFT BLACK OVAL key to decrease the value. The displayed value represents dots. **Default:** +0 **Range:** –120 to +120 dot rows The label top position adjusts the print position vertically on the label. Positive numbers adjust the label top position further down the label (away from the printhead), negative numbers adjust the position up the label (toward the printhead).
	LEFT POSITION	**Adjusting Left Position:** Press the LEFT BLACK OVAL key to move the cursor, press the RIGHT BLACK OVAL key to change between + and – and to increase the value of the digit. The displayed value represents dots. **Default:** 0000 **Range:** –9999 to +9999 **NOTE:** For a negative value, enter the value before changing to the minus sign. This parameter establishes how far from the left edge of a label the format begins to print by adjusting horizontal positioning on the label. Positive numbers adjust the printing to the left by the number of dots selected, negative numbers shift printing to the right.

Press	LCD Shows	Action/Explanation
	HEAD TEST COUNT	**Setting the Head Test Count:** Press the LEFT BLACK OVAL key to move the cursor, press the RIGHT BLACK OVAL key to change the value of the digit. **Default:** 0000 (disables the test) **Range:** 0000–9999 The printer periodically performs a test of the printhead functionality, called a "printhead test" or "head test." This parameter establishes how many labels are printed between these internal tests.
	HEAD RESISTOR	**Setting the Head Resistor Value:** Press the LEFT BLACK OVAL key to move the cursor, press the RIGHT BLACK OVAL key to increase the value of the digit. **CAUTION:** This parameter should be changed only by qualified personnel! **Initial Value:** Factory-set to match the printhead shipped with your printer. **Default Value:** 0500 **Range:** 0500–1175 This value has been pre-set at the factory to match the resistance value of the printhead. It does not need to be changed unless the printhead is replaced or the main logic board is replaced. **CAUTION:** DO NOT set the value higher than that shown on the printhead. Setting a higher value may damage the printhead! Before replacing a printhead, look on the printhead for the label that shows the resistance value (ohm value).
	VERIFIER PORT	**Setting the Verifier Port:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Off **Selections:** Off, 1 VER-RPRNT, 2 VER-THRUPUT The auxiliary port is used to determine how the printer reacts to the on-line verifier. There are currently three operating conditions for this port: • Off: The verifier port is off. • 1 VER-RPRNT ERR: Label reprinted if verifier detects an error. If a bar code is near the upper edge of the label, the label is fed out far enough to be verified and then backfed to allow the next label to be printed and verified. • 2 VER-THRUPUT: Allows greatest throughput but may not indicate a verification error immediately upon detection. May print from one to three labels before an error is recognized and printing stops. For more information on the operation of the optional verifier, refer to the documentation provided with that option.

Press	LCD Shows	Action/Explanation
	APPLICATOR PORT	**Setting the Applicator Port:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Off **Selections:** Off, mode 1, mode 2, mode 3, mode 4 Determines the action of the verifier port. • Off: The applicator port is off. • Mode 1: Asserts the ~END_PRINT signal low while the printer is moving the label forward. • Mode 2: Asserts the ~END_PRINT signal high while the printer is moving the label forward. • Mode 3: Asserts the ~END_PRINT signal low for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. • Mode 4: Asserts the ~END_PRINT signal high for 20 milliseconds when a label has been completed and positioned. Not asserted during continuous printing modes. **NOTE:** Set as suggested by the applicator manufacturer.
	WEB S.	These parameters are automatically set during the calibration procedure. They should be changed only by a qualified service technician. Refer to the maintenance manual for more information on these parameters. Press the NEXT/SAVE key repeatedly to skip these parameters.
	MEDIA S.	
	RIBBON S.	
	MARK S.	
	MARK MED S.	
	MEDIA LED	
	RIBBON LED	
	MARK LED	

Press	LCD Shows	Action/Explanation
	START PRINT SIG	**Start Print Signal:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Pulse Mode **Selections:** Pulse Mode, Level Mode This parameter determines how the printer reacts to the Start Print Signal input on pin 3 of the applicator interface connector at the rear of the printer. • In Pulse Mode, labels print when the signal transitions from HIGH to LOW. • In Level Mode, labels print as long as the signal is asserted LOW. **CAUTION:** Start Print Signal is set by the applicator manufacturer and should not be changed unless the factory defaults have been reloaded. Please make a note of it! While other choices are valid, the printer must be returned to its designated setting in order for it to work properly.
	RESYNCH MODE	**Resynch Mode:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Feed Mode **Selections:** Feed Mode, Error Mode This parameter determines how the printer reacts if the label synchronization is lost and the label top is not where expected. FEED MODE—If the label top is not where expected, the printer feeds a blank label to find the label top position. ERROR MODE—If the label top is not where expected, the printer stops, enters the PAUSE mode, displays the message "Error Condition Feed Label," flashes the ERROR LED, and asserts the "Service Required" signal (pin 10 on the Applicator Interface Connector). To resynch the media to the top of the label in ERROR mode, press the PAUSE key to exit the PAUSE state. The ERROR LED stops flashing and the "Service Required" signal is deactivated. The action of the printer is determined by the "Head Close" configuration selection: • "Calibration"—determines the length of the label. • "Feed"—feeds the labels to the first registration point. • "Length"—used in continuous mode to feed the last stored label length. • "No Motion"—the media does not move. The user must press the FEED key to cause the printer to resynch to the start of the next label.

Press	LCD Shows	Action/Explanation
	LCD ADJUST	**LCD Adjustment:** Press the LEFT BLACK OVAL key to decrease the value (reduce contrast), press the RIGHT BLACK OVAL key to increase the value (increase contrast). **Range:** 00–19 This parameter allows you to adjust the contrast of your LCD if it is difficult to read.
	FORMAT CONVERT	**Format Convert:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** None **Selections:** None, 150 → 300, 150 → 600, 200 → 600, 300 → 600 Selects the bitmap scaling factor. The first number is the original dots per inch (dpi) value; the second, the dpi to which you would like to scale. **NOTE:** Not applicable on all printers.
	IDLE DISPLAY	**Idle Display:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Firmware version **Selections:** mm/dd/yy (24 hour), mm/dd/yy (12 hour), dd/mm/yy (24 hour), dd/mm/yy (12 hour) This parameter selects the LCD options for the real-time clock. **NOTE:** If the default value is not selected, pressing either BLACK OVAL key briefly displays the firmware version of the printer.
	RTC DATE	**RTC (Real-time clock) Date:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. This parameter allows you to set the date following the convention selected in "IDLE DISPLAY."
	RTC TIME	**RTC (Real-time clock) Time:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. This parameter allows you to set the time following the convention selected in "IDLE DISPLAY."

Press	LCD Shows	Action/Explanation
	IP RESOLUTION*	**IP Resolution:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Dynamic **Selections:** Dynamic, permanent Depending on the selection, allows either the user ("permanent") or the server ("dynamic") to select the IP address. For more information, refer to *ZebraNet Networking: PrintServer II Installation and User's Guide*.
	IP PROTOCOLS*	**IP Protocols:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** All **Selections:** All, gleaning only, RARP, BOOTP, DHCP, DHCP/BOOTP If "dynamic" was chosen in the previous parameter, this selection determines the method(s) by which the PrintServer II receives the IP address from the server. For more information, refer to *ZebraNet Networking: PrintServer II Installation and User's Guide*.
	IP ADDRESS*	**IP Address:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. This parameter allows you to select the IP address if "permanent" was chosen in "IP RESOLUTION." (If "dynamic" was chosen, the user cannot select the address.) For more information, refer to *ZebraNet Networking: PrintServer II Installation and User's Guide*.
	SUBNET MASK*	**Subnet Mask:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Permanent (user must set) **Selections:** Dynamic (user may set, but server can assign), permanent This parameter selects the part of the IP address that is considered to be part of the local network. It can be reached without going through the default gateway.
	DEFAULT GATEWAY*	**Default Gateway:** Press the LEFT BLACK OVAL key to move to the next digit position, press the RIGHT BLACK OVAL key to increase the value of the digit. This parameter allows you to select the IP address that the network traffic is routed through if the destination address is not part of the local network.

* ZebraNet® PrintServer II option required

Press	LCD Shows	Action/Explanation
	LANGUAGE	**Selecting the Display Language:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** English **Selections:** English, Spanish, French, German, Italian, Norwegian, Portuguese, Swedish, Danish, Spanish 2, Dutch, Finnish, Japanese This parameter allows you to change the language used on the LCD.
You have now completed the entire configuration and calibration sequence. You may either press the NEXT/SAVE key or the SETUP/EXIT key.		
	DARKNESS	You are now back at the first parameter in the configuration sequence. **NOTE:** If you pressed the NEXT/SAVE key but are through programming the printer configuration, you may press the SETUP/EXIT key and continue with the "SAVE CHANGES" function.
	SAVE CHANGES	**Save Changes:** Press the RIGHT or LEFT BLACK OVAL key to display other choices. **Default:** Permanent **Selections:** Permanent, temporary, cancel, load defaults, load last save This display appears when you attempt to exit the setup mode. • Permanent: Permanently saves the changes, even when printer power is turned off. • Temporary: Saves the changes until changed again or until power is turned off. • Cancel: Cancels all changes since you entered the setup mode except for darkness and tear-off position (if they were changed). • Load defaults: Loads factory defaults. **NOTE:** Loading factory defaults requires calibration. • Load last save: Loads the values from the last permanent save.
—	PRINTER READY	You have exited the configuration and calibration sequence and are now ready for normal printer operation.

Cleaning

Table 1 provides a brief cleaning schedule. Specific cleaning procedures are provided on the following pages.

Table 1. Cleaning Schedule

Area	Method	Interval
Printhead	Solvent*†	When a "CLEAN HEAD NOW" warning appears, or: **Direct thermal print mode:** After every roll of media (or 500'/152 m of fanfold media). **Thermal transfer print mode:** After every roll of ribbon.
Platen roller	Solvent*	
Transmissive sensor	Air blow	
Black mark sensor	Air blow	
Media path	Solvent*	
Ribbon sensor	Air blow	
Label available sensors	Air blow	Monthly
Tear-off/peel-off bar	Solvent*	As needed
Snap plate	Solvent*	
Cutter	Solvent*	
* Zebra recommends using 90% isopropyl alcohol.		
† For 600 dpi printers, use Zebra's *Save-a-Printhead* cleaning film (see page 70 for details).		

CAUTION: Use only the cleaning agents indicated. Zebra Technologies is not responsible for damage caused by any other fluids being used on this printer.

Cleaning the Exterior

The exterior surfaces of the printer may be cleaned with a lint-free cloth. Do not use harsh or abrasive cleaning agents or solvents. If necessary, a mild detergent solution or desktop cleaner may be used sparingly.

Cleaning the Interior

Inspect this area after every four rolls of media. Remove any dirt and lint from the interior of the printer using a soft bristle brush and/or vacuum cleaner.

Cleaning the Printhead and Platen Roller

Inconsistent print quality, such as voids in the bar code or graphics, may indicate a dirty printhead. For best results, perform the following cleaning procedure after every roll of ribbon.

NOTES: For 600 dpi printers, clean after every roll of media or when a "CLEAN HEAD NOW" warning appears on the LCD.

You do not need to turn off the printer before cleaning the printhead. If power is turned off, all label formats and images, as well as any temporarily saved parameter settings stored in the printer's internal memory, are lost. When power is turned back on, these items must be reloaded.

If power is removed from a 600 dpi printer when cleaning the printhead, the "CLEAN HEAD NOW" warning shown on the LCD will not disappear.

WARNING: An improperly seated printhead data cable or power cable could result in the printhead generating excessive heat that could cause harm if it is touched.

To clean the printhead, refer to Figure 30 and follow these steps:

1. Open the printhead.
2. Remove the media and ribbon (if loaded).

3. Moisten an applicator tip with solvent and wipe along the print elements from end to end. (The print elements are on the brown strip just behind the chrome strip on the printhead.) Allow a few seconds for the solvent to evaporate.
4. Rotate the platen roller and clean thoroughly with solvent and an applicator.
5. Brush/vacuum any accumulated paper lint and dust away from the rollers.
6. Reload ribbon and/or media and close the printhead.

NOTE: If print quality has not improved after performing this procedure, try cleaning the printhead with *Save-a-Printhead* cleaning film. This specially coated material removes contamination buildup without damaging the printhead. Call your authorized Zebra reseller or distributor or see page 70 for more information.

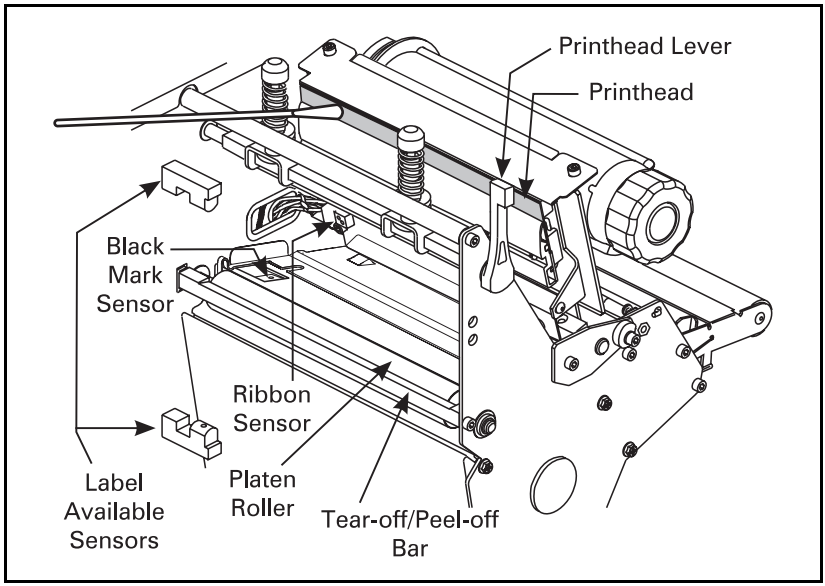


Figure 30. Printhead and Platen Roller Cleaning

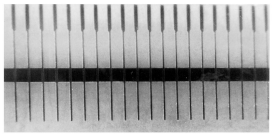
Extend the Life of Your Printhead With *Save-a-Printhead* Cleaning Film

(Recommended for all Zebra printers—especially 600 dpi printers.)

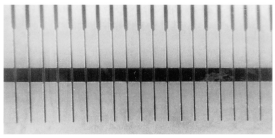
Challenge

The printhead is the most critical component in your printer, and possibly the most delicate. It is a consumable item just like the brakes on your car, which eventually wears over time. With ongoing careful attention and maintenance, you can ***extend the life of the printhead***.

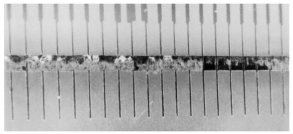
Below are photographs of three printheads. The first printhead is brand new. The second has printed over 1 million linear inches of thermal transfer labels and has been properly maintained. The third printhead has printed far fewer labels, but without proper care and maintenance, signs of abrasion and contamination buildup are evident.



New



Over 1 Million Inches
(Properly Maintained)



Less Than 1 Million Inches
(Without Proper Care)

Preventive Maintenance

For optimum performance, clean the printhead regularly after every roll of thermal transfer ribbon or after every roll of direct thermal labels. Take care when handling or cleaning the printhead by removing any jewelry that may scratch the printhead and use a grounding strap or anti-static mat to discharge static electricity that could damage the printhead.

NOTE: For 600 dpi printers, clean after each roll of media or when a "CLEAN HEAD NOW" warning appears on the LCD.

To start, use only the pre-soaked (isopropyl alcohol) cleaning swabs provided in the preventive maintenance kit. First, open the media cover to access the printhead, then open the printhead. Lightly blow or brush away any loose dust and lint particles within the print mechanism (such as rollers, media/ribbon sensors, and printhead). NEVER use any hard, metallic, or abrasive objects—such as a screwdriver—to remove adhesives or other contaminants that may have built up on the printhead. Next, press the swab tip against the printhead and swipe the print elements from end to end. Finally, turn the platen rollers while wiping them from side to side. Repeat this last step until the swab no longer shows dirt.

Avoid the Contributing Factors to Premature Printhead Failure

Abrasion: Over time, the movement of media/ribbon across the printhead wears through the protective ceramic coating, exposing and eventually damaging the print elements (dots).

In order to avoid abrasion:

- Clean your printhead frequently and use well-lubricated thermal transfer ribbons with backcoatings optimized to reduce friction.
- Minimize printhead pressure and burn temperature settings by optimizing the balance between the two.
- Ensure that the thermal transfer ribbon is as wide or wider than the label media to prevent exposing the elements to the more abrasive label material.

Ribbon Backcoating and Buildup: Printhead contamination from direct thermal media or thermal transfer ribbon may occur in applications requiring high burn settings, high head pressure, high speed, or high volume. This contamination builds up on the printhead elements, creating a barrier to the heat transformation required to produce high quality images. Contaminant buildup occurs gradually and results in poor print quality that may look like faded print or failed print element(s). This buildup is very resistant to cleaning with the pre-soaked swabs and is difficult to remove.

In order to avoid ribbon backcoating and buildup:

- Use thermal transfer ribbons that have been specially cured to provide backcoat protection for high-demand applications. These ribbons (sometimes referred to as anti-stick ribbons) also dissipate static and provide more lubrication.
- Follow the recommended Printhead Preventive Maintenance procedures.
- Use our *Save-a-Printhead* cleaning film to remove printhead contamination buildup quickly and easily.

Save-a-Printhead Cleaning Film

Save-a-Printhead cleaning film is a specially coated film that removes contamination buildup without damaging the printhead.

Save-a-Printhead cleaning film extends the life of your printhead, reduces maintenance downtime and the cost of replacing a printhead, and is an inexpensive, easy, and quick way to remove contaminants without having to remove the printhead.

Use *Save-a-Printhead* cleaning film when you see degrading print quality that looks like faded print or a failed print element(s) that cannot be corrected by cleaning with the pre-soaked cleaning swabs.

How to Use *Save-a-Printhead* Cleaning Film

NOTE: If power is removed from a 600 dpi printer when cleaning the printhead, the "CLEAN HEAD NOW" warning shown on the LCD will not disappear.

WARNING: An improperly seated printhead data cable or power cable could result in the printhead generating excessive heat that could cause harm if it is touched.

1. Open the media cover.
2. Open the printhead and remove media and ribbon from the print mechanism.

3. Clean the printhead per the recommended Preventive Maintenance procedures.
4. Position the *Save-a-Printhead* film in the print path, placing the glossy side down away from the printhead (matte side up).
5. Close and latch the printhead.
6. Slowly pull the full length of the film through the print mechanism.
7. Again, clean the printhead per the recommended Preventive Maintenance procedures.
8. Reload media and ribbon, close and latch the printhead.
9. Close the media cover.
10. Print labels and inspect for improved print quality. If quality has not improved, contact our Technical Support staff at 1.847.913.2259 or visit our Web site: http://www.zebra.com.

Only one pass of *Save-a-Printhead* film is required to remove contamination buildup, and each strip of film can be used up to 10 times. Discard the strip when residue buildup or other contamination is apparent.

If a replacement printhead is needed, product from the Original Equipment Manufacturer (OEM) is strongly recommended to ensure that your printer and part warranties remain intact and that the product performs optimally.

How to Order *Save-a-Printhead* Cleaning Film Kits

There are five kits to accommodate the different width printers. Each kit contains three 10″ (25.4 mm) long strips of film. See Table 2 to order the appropriate kit for your printer:

Table 2. *Save-a-Printhead* Cleaning Film Kits

Order kit number:	For Printers with Print Widths:
46902	3.0″–4.0″ (76 mm–102 mm)
44902	4.0″–5.0″ (102 mm–127 mm)
48902	5.0″–6.0″ (127 mm–152 mm)
38902	6.0″–7.0″ (152 mm–178 mm)
22902	8.0″–9.0″ (178 mm–229 mm)

Cleaning the Sensors

The media, ribbon, and label available sensors should be cleaned on a regular basis to ensure proper operation of the printer. To locate these sensors, refer to Figure 30 on page 69, Figure 6 on page 11, and Figure 7 on page 12. Brush/vacuum any accumulated paper lint and dust off of these sensors.

Cleaning the Snap Plate

Clean the snap plate to remove label adhesive or a label that has adhered to the underside of the snap plate.

Refer to Figure 31.

1. Insert a small-blade screwdriver or similar tool into the loop on the left side of the snap plate. Lift the snap plate.

CAUTION: Take care not to bend, twist, or otherwise deform the loops! If the snap plate is damaged in any way, a new plate may be required for proper ribbon sensing.

2. Repeat step #1 on the right side of the snap plate.
3. Remove the snap plate from the printer.
4. Clean the snap plate with cleaning solvent and a soft cloth.

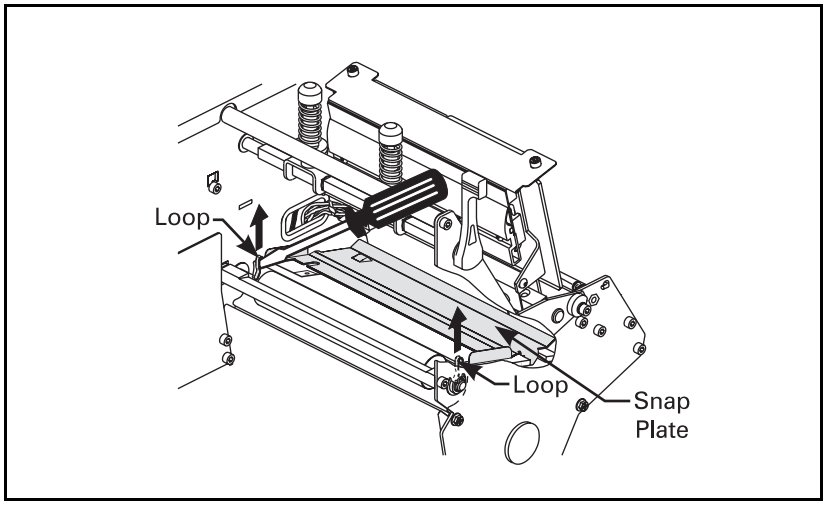


Figure 31. Snap Plate Removal and Cleaning

Refer to Figure 32.

5. To reinstall the snap plate, insert the two tabs on the bottom of the snap plate into the two slots of the media pathway.
6. Slide the snap plate toward you.
7. Press down on the loops to lock the snap plate into place.

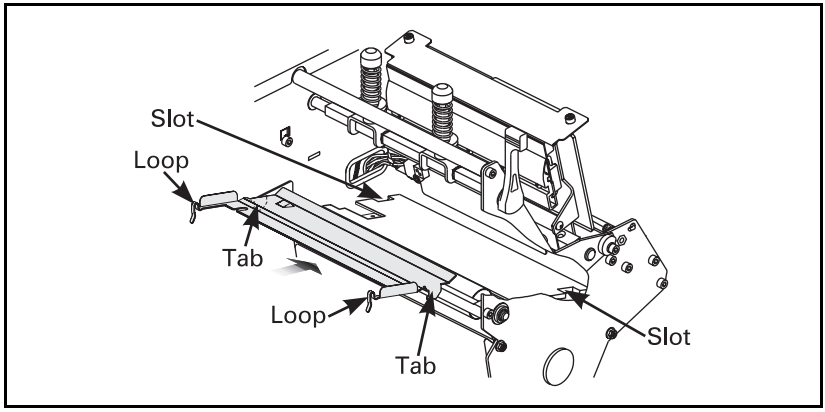


Figure 32. Snap Plate Reinstallation

Cleaning the Cutter Module

(For printers equipped with the optional cutter.)

If labels are not being cut properly or if the cutter jams with labels, turn off the printer power and unplug the printer. Then, clean the stationary cutter blade with cleaning solvent. This removes label adhesive and/or paper debris. If further cutter cleaning is necessary, or if the cutter continues to perform unsatisfactorily, contact an authorized service technician.

Lubrication

CAUTION: No lubricating agents of any kind should be used on this printer! Some commercially available lubricants will damage the finish and the mechanical parts.

Fuse Replacement

The printer uses a metric-style fuse (5 × 20 mm IEC) rated at F5A, 250V. The AC power entry module comes with two approved fuses in the fuse holder: one is "in-circuit" and the second is provided as a "spare" (refer to Figure 34). The end caps of the fuse must bear the certification mark of a known international safety organization (see Figure 41 on page 98). To replace a faulty fuse, use the following procedure:

WARNING: Turn the AC power switch OFF and remove the power cord before performing this procedure.

1. Refer to Figure 33. Using a small-blade screwdriver or similar tool, remove the fuse holder, which is part of the AC power entry module at the rear of the printer.

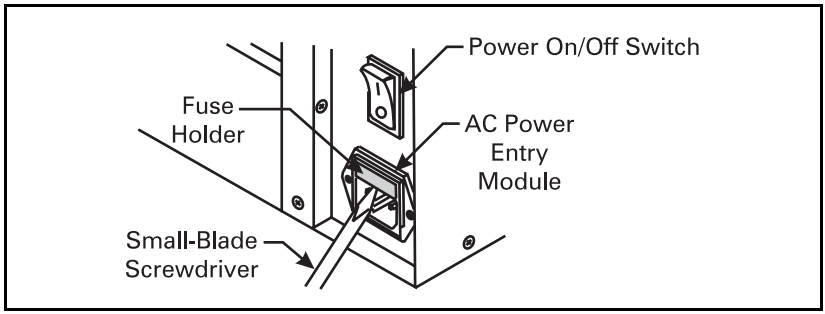


Figure 33. Power Switch Location

2. Remove the faulty fuse and install a new fuse in the "in-circuit" position as shown in Figure 34. If you use the spare fuse, be sure to order a replacement fuse. Fuses can be ordered from your Zebra distributor.

NOTE: The spare fuse should be the exact type and rating as the original "in-circuit" fuse.

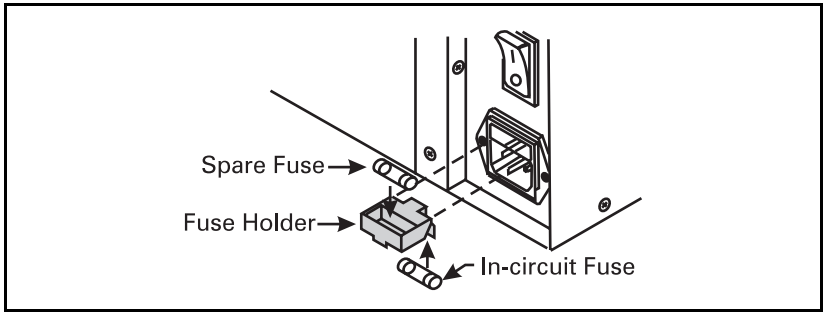


Figure 34. Fuse Removal and Installation

3. Snap the fuse holder back into the AC power entry module.
4. Reconnect the power cord and turn the printer ON.

NOTE: If AC power is not restored, an internal component failure may have occurred and the printer requires servicing.

Adjustments

Toggle Positioning

Both toggles should be positioned so that they provide even pressure on the media. The toggles are positioned by sliding them to the desired location. On media too narrow to accommodate both toggles, position one toggle over the center of the media and decrease the pressure on the unused toggle. If you are using a 90*Xi*III*Plus* or 96*Xi*III*Plus* printer, position the single toggle over the center of the media.

NOTE: Make sure that the toggle pressure is even across the width of the media; otherwise, print quality will not be consistent across the label and the media and/or ribbon may "drift."

Printhead Pressure Adjustment

This adjustment may be necessary if printing is too light on one side or if thick media is used. Refer to Figure 35.

Ensure that the toggle(s) are positioned properly. If positioning them properly does not solve the problem, use the following procedure to adjust printhead pressure:

1. Print some labels at 2.4″/61 mm per second by running the PAUSE Key Self Test (see page 89).
2. While printing labels, lower the darkness setting until a gray level of printing is seen.
3. Loosen the knurled (upper) locking nuts at the top of the toggle assembly/assemblies.
4. Some media types require higher pressure to print well. For these media, increase or decrease spring pressure using the knurled (lower) adjusting nuts on the shafts of the toggle until the left and right edges of printed area are equally dark.

NOTE: Printhead life can be maximized by using the lowest pressure that produces the desired print quality.

5. Increase darkness to the optimum level for the media being used.
6. Retighten locking nuts.

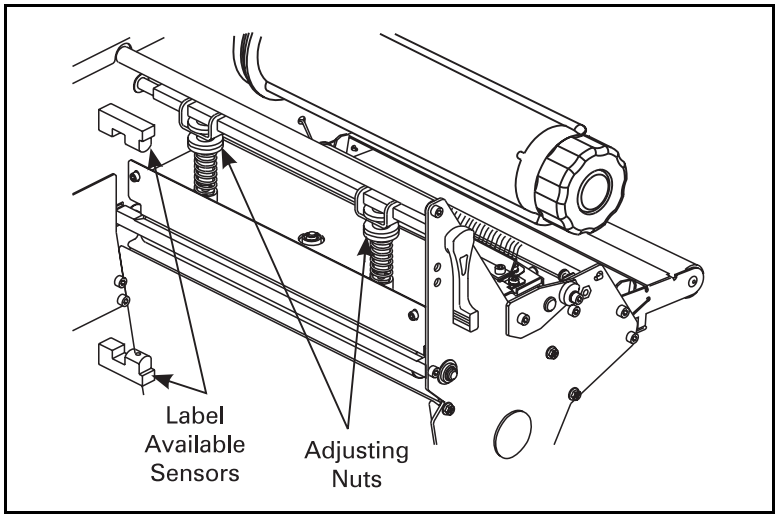


Figure 35. Printhead Pressure Adjustment

Media Sensor Position Adjustment

See “Positioning the Media Sensors” on page 10.

LED Error Conditions and Warnings

Error Condition—Ribbon Out

Problem	Solution
In thermal transfer mode, the ribbon is not loaded *or* loaded incorrectly.	Load the ribbon correctly. See "Ribbon Loading" on page 39.
In thermal transfer mode, the ribbon sensor is not sensing loaded ribbon correctly.	Perform the media and ribbon sensor calibration (see page 17).
In direct thermal mode, when ribbon is not used:	Ensure that ribbon is not installed and put the printer in direct thermal print mode.
	Ensure that the printer driver or software settings are correctly set (if applicable).

Error Condition—Paper Out

Problem	Solution
The media is not loaded *or* loaded incorrectly.	Reload the media. Refer to "Roll Media Loading" on page 29.
The media sensor is not adjusted properly.	Check the position of the upper and lower media sensors. Refer to "Positioning the Media Sensors" on page 10.
The printer is set for non-continuous media, but continuous media is loaded.	Either load the correct media or set the printer for the correct media type using the front panel controls.
	Ensure that the printer driver or software settings are correctly set (if applicable).
	Calibrate the printer (see page 17).
The incorrect media sensor is being used.	Using the front panel controls, check the sensor type to ensure that the correct one is used for the media loaded. See page 16. Calibrate the printer (see page 17).
The maximum label length is set shorter than the label length being used.	Using the front panel controls, set the label length to a value that is slightly longer than the length of the label being used.

Error Condition—Head Open

Problem	Solution
The printhead is not fully closed.	Close the printhead.

Error Condition—Head Element Bad

Problem	Solution
One or more of the printhead elements has failed the printhead element test.	If the failed elements impact your printing application, replace the printhead. To override this error, disable the head test count feature on the front panel by defaulting the value to "0000." See page 60.

Warning—Ribbon In

Problem	Solution
The ribbon is loaded.	Remove the ribbon and set the printer to direct thermal mode.
	Ensure that the printer driver and/or software settings are correctly set (if applicable).

Warning—Head Too Hot

Problem	Solution
The printhead is over temperature.	Allow the printer to cool. Printing automatically resumes when the printhead elements cool to an acceptable operating temperature.

Warning—Clean Head Now

Problem	Solution
The printhead requires cleaning.	See page 68 and clean the printhead. **NOTE:** If the warning does not go away after the printhead is cleaned, open the printhead and then close it.

Warning—Head Cold

Problem	Solution
The printhead is under temperature.	Continue printing while the printhead reaches the correct operating temperature. If the error remains, the environment may be too cold for proper printing. Relocate the printer to a warmer area.
Printhead data cable is not properly connected.	**WARNING:** The printhead can be very hot and can cause severe burns. Allow the printhead to cool. Disconnect and reconnect data cable to the printhead. Ensure that the cable connector is fully inserted into the printhead connector.

Warning—Cutter Jammed

Problem	Solution
Cutter blade is in the media path.	Turn off the printer power and unplug the printer. Inspect the cutter module for debris and clean as needed following the cleaning instructions on page 76.

Out of Memory*

Problem	Solution
*There is not enough memory to perform the function shown on the second line of the error message.	Shut off printer to clear memory and try to print again. If the error recurs, there is insufficient memory for the label length, downloaded fonts/graphics, and images.
	Ensure that the device, such as Flash memory or PCMCIA card, is installed and not write-protected or full.
	Ensure that the data is not directed to a device that is not installed or available.

Print Quality Problems

General Print Quality Issues

Problem	Solution
You are using an incorrect media and ribbon combination for your application.	Consult your authorized Zebra reseller/distributor for information and advice.
The printer is set at the incorrect print speed.	For optimal print quality, set the print speed to the lowest possible setting via ZPL II, the driver, or the software.
The printer is set at the incorrect darkness level.	For optimal print quality, set the darkness to the lowest possible setting via the front panel, the driver, or the software.
The printhead is dirty.	Clean the printhead according to the instructions on page 68.
There is light printing (or no printing) on the left or right side of the label *or* the printed image is not sharp.	The toggle pressure needs to be adjusted. Follow the printhead pressure adjustment instructions on page 78.

Gray lines on blank labels with no consistent pattern

Problem	Solution
The printhead is dirty.	Clean the printhead according to the instructions on page 68.

Light, consistent vertical lines running through all of the labels

Problem	Solution
The printhead or platen roller is dirty.	Clean the printhead, platen roller, or both according to the instructions on page 68.

Intermittent creases on the left and right edges of the labels

Problem	Solution
There is too much toggle pressure on the printhead.	Reduce the toggle pressure. See “Printhead Pressure Adjustment” on page 78.

Wrinkled Ribbon

Problem	Solution
The ribbon is not loaded correctly.	Load the ribbon correctly. See “Ribbon Loading” on page 39.
The darkness setting is incorrect.	Set the darkness to the lowest possible setting for good print quality. See “DARKNESS” on page 46.
Incorrect printhead pressure or balance.	Set the pressure to the minimum required for good print quality. See “Printhead Pressure Adjustment” on page 78.
The media is not feeding correctly. It is “walking” from side to side.	Make sure that the media guide and media supply guide touch the edge of the media.
	Adjust the ribbon strip plate.

Communications

A label format was sent to the printer but not recognized. The DATA light does not flash.

Problem	Solution
The communication parameters are incorrect.	Check the printer driver or software communications settings (if applicable).
	Check the printer host port setting via the front panel (see page 54). Select the port that matches the one being used by the host.
	Ensure you are using the correct communication cable. See page 23 for the requirements.
	Using the front panel controls, check the protocol setting. It should be set to “none.” See page 55.
	Ensure that the correct driver is being used, if applicable.

A label format was sent to the printer. Several labels print, then the printer skips, misplaces, misses, or distorts the image on the label.

Problem	Solution
The host is set to EPP parallel communications.	Change the settings on the computer host to standard parallel communications.
The serial communication settings are incorrect.	Ensure that the flow control settings match.
	Check the communication cable length. See page 23 for requirements.
	Check the printer driver or software communications settings (if applicable).

A label format was sent to the printer but not recognized. The DATA light flashes but no printing occurs.

Problem	Solution
The prefix and delimiter characters set in the printer do not match the ones in the label format.	Verify the prefix and delimiter characters. See page 57.
Incorrect data is being sent to the printer.	Ensure that ZPL is being used.
	Check the communication settings on the computer. Ensure that they match the printer settings.

The printer fails to calibrate or detect the top of the label.

Problem	Solution
The printer was not calibrated for the label being used.	Perform the calibration procedure on page 17.
The printer is configured for continuous media.	Set the media type to non-continuous media.
The driver or software configuration is not set correctly.	As driver or software settings produce ZPL commands that can overwrite the printer configuration, check the driver or software media-related setting.

Printer Diagnostics

Power-On Self Test

A limited Power-On Self Test (POST) is performed automatically each time the printer is turned on (additional self tests can be performed by pressing the CANCEL and CALIBRATE keys when you turn the printer on). During either test sequence, the front panel LEDs illuminate and the LCD monitors the progress of the POST. If the printer fails any of these tests, the word "FAILED" is added to the LCD. If this occurs, notify an authorized Zebra reseller.

Additional Printer Self Tests

These self tests produce sample printouts and provide specific information that help determine the operating conditions for the printer.

Each self test is enabled by pressing a specific front panel key or combination of keys while turning the POWER switch on. Keep the key(s) depressed until the DATA light turns off. When the POST is complete, the selected self test starts automatically.

NOTES: When performing self tests, avoid sending a label format to the printer. In the case of a remote host, ensure that the printer is off and disconnect all data interface cables from the printer.

When canceling a self test prior to its actual completion, always turn the printer power off and then back on to reset the printer.

When performing these self tests while in the Peel-Off mode, you must remove the labels as they become available.

If your media is not wide enough or long enough, unexpected and/or undesired results may occur. Make sure that your print width is set correctly for the media you are using before you run any self tests, otherwise the test may print out on the platen roller. See page 49 for information on setting the print width.

CANCEL Key Self Test

This self test prints a listing of the configuration parameters currently stored in the printer's memory. See Figure 36 (depending on the options ordered, your label may look different).

1. Turn the printer off.
2. Press and hold the CANCEL key while turning on the power.

The configuration may be changed either temporarily (for specific label formats or ribbon and label stock) or permanently (by saving the new parameters in memory). Saving new parameters occurs whenever a calibration procedure is performed. Refer to page 15 for further information about the configuration procedure. Additional Power-Up Self Tests are also performed during the POST for this test.

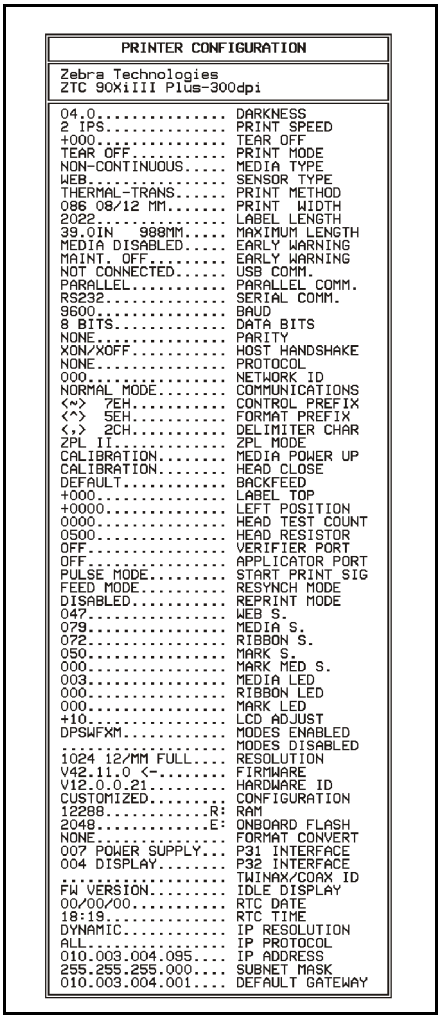


Figure 36. Configuration Label

PAUSE Key Self Test

This self test can be used to provide the test labels required when making adjustments to the printer's mechanical assemblies. See the sample printout in Figure 37.

1. Turn off the printer.
2. Press and hold the PAUSE key while turning on the power.
   - The initial self test prints 15 labels at 2.4″/61 mm per second (1″/25.4 mm per second for the 96*Xi*III*Plus*), then automatically pauses the printer. When the PAUSE key is pressed, an additional 15 labels print.
   - While the printer is paused, pressing the CANCEL key alters the self test. When the PAUSE key is pressed, the printer prints 15 labels at 6″/152 mm per second (4″/102 mm per second for the 96*Xi*III*Plus*).
   - While the printer is paused, pressing the CANCEL key again alters the self test a second time. When the PAUSE key is pressed, the printer prints 50 labels at 2.4″/61 mm per second (1″/25.4 mm per second for the 96*Xi*III*Plus*).
   - While the printer is paused, pressing the CANCEL key again alters the self test a third time. When the PAUSE key is pressed, the printer prints 50 labels at 6″/152 mm per second (4″/102 mm per second for the 96*Xi*III*Plus*).
   - While the printer is paused, pressing the CANCEL key again alters the self test a fourth time. When the PAUSE key is pressed, the printer prints 15 labels at the printer's maximum speed.
   - To exit this self test at any time, press and hold the CANCEL key.

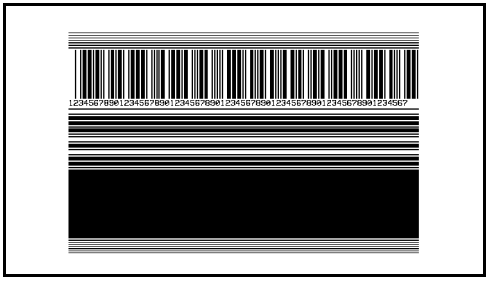


Figure 37. Test Label

FEED Key Self Test

See Figure 38.

1. Turn off the printer.
2. Press and hold the FEED key while turning on the power.

This self test prints out at various darkness settings above and below that of the darkness value shown on the configuration label. Inspect these labels and determine which one has the best darkness setting for your application. This value can be entered into the printer by setting the darkness during the configuration procedure (see page 46 for more information).

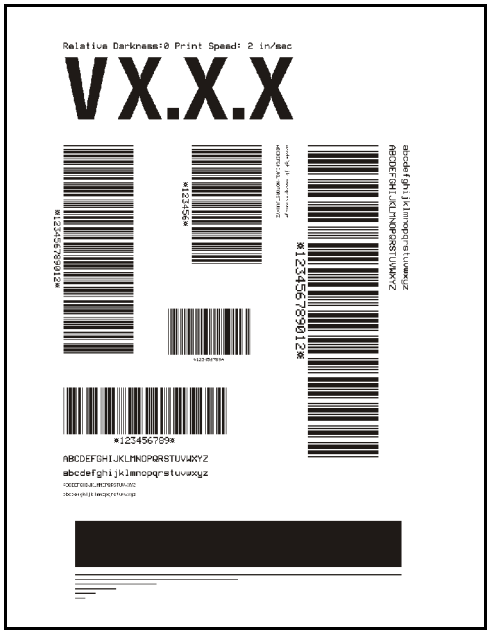


Figure 38. Darkness Setting Label

The value printed on that label is added to (plus) or subtracted from (minus) the darkness value specified on the configuration label. The resulting numeric value (0 to 30) is the best darkness value for that specific media/ribbon combination.

FEED Key and PAUSE Key Self Test

1. Turn off the printer.
2. Press and hold the FEED and PAUSE keys while turning on the power.

Performing this self test temporarily resets the printer configuration to the factory default values. These values are active only until power is turned off unless you save them permanently in memory.

Communications Diagnostics Test

This test is controlled from the front panel display. Refer to "COMMUNICATIONS" on page 56. A typical printout from this test is shown in Figure 39. Turn off the power to exit this self test.

NOTE: This label is inverted when printed.

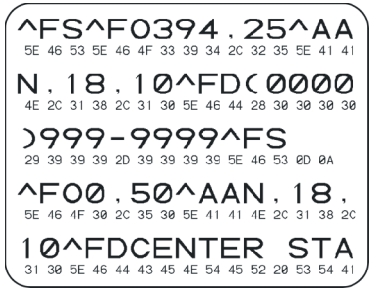


Figure 39. Sample Communications Label

Additional Printer Diagnostics

Additional diagnostic tests are available for this printer, however, they are beyond the scope of this User's Guide. Refer to the Maintenance Manual for information about these additional tests.

Specifications

NOTE: Printer specifications are subject to change without notice.

Media Handling

- **Tear-Off** mode: Labels are produced in strips.
- **Peel-Off** mode: Labels are dispensed and peeled from the liner as needed.
- **Cutter** mode: Labels are printed and individually cut.
- **Rewind** mode: Labels are rewound internally.

Standard *Xi*III*Plus* Features

- Thermal transfer and direct thermal printing
- DRAM 16 MB
- USB 2.0 Port
- Real-time Clock
- Advanced Counter

Options

• Cutter	• IBM twinax interface
• Rewind	• IBM coax interface
• Cutter-rewind	• Font cards
• Cutter tray	• PCMCIA memory cards/CompactFlash memory cards
• Media supply spindle (1.6″/40 mm core)	• Double-hinged media door with clear panel
• Media supply spindle (3″/76 mm core)	• ZebraNet® Wireless Card Socket
• BAR-ONE® Windows™-based WYSIWYG on-screen label design and print application software	• ZebraNet® PrintServer II, including Ethernet interface (10Base-T), ZebraLink™ WebView graphical setup and printer control, and ZebraLink™ Alert unsolicited error notification
• Printer drivers for Windows™ operating systems	

Zebra Programming Language (ZPL II®)

• Downloadable graphics, scalable and bitmap fonts, and label formats	• Controlled via mainframe, mini-computer, PC, portable data terminal
• Object copying between memory areas (RAM, memory card, and internal Flash)	• Programmable quantity with print, pause, and cut control
• Code Page 850 character set	• Communicates in printable ASCII characters
• Adjustable print cache	• Error-checking protocol
• Data compression	• Status message to host upon request
• Automatic virtual input buffer management	• Serialized fields
• Format inversion	• In-spec OCR-A and OCR-B
• Mirror image printing	• UPC/EAN
• Four-position field rotation (0°, 90°, 180°, 270°)	• User-programmable password
• Slew command	

Bar Codes

• Bar code ratios—2:1, 7:3, 5:2, 3:1	• ISBT-128
• Codabar (supports ratios of 2:1 up to 3:1)	• LOGMARS
• CODABLOCK	• MaxiCode
• Code 11	• Micro PDF
• Code 39 (supports ratios of 2:1 up to 3:1)	• MSI
• Code 49 (2-dimensional bar code)	• PDF-417 (2-dimensional bar code)
• Code 93	• Plessey
• Check digit calculation where applicable	• POSTNET
• Data Matrix	• QR-Code
• EAN-8, EAN-13, EAN extensions	• Standard 2 of 5
• Industrial 2 of 5	• UPC-A, UPC-E, UPC extensions
• Interleaved 2 of 5 (supports ratios of 2:1, up to 3:1, Modulus 10 Check Digit)	• Code 128 (with subsets A, B, and C and UCC case C codes)

General Specifications

General Specifications			90/96*Xi*III*Plus*		140*Xi*III*Plus*		170*Xi*III*Plus*		220*Xi*III*Plus*	
Height			15.5″	393.7 mm	15.5″	393.7 mm	15.5″	393.7 mm	15.5″	393.7 mm
Width			9.15″	232.4 mm	11.15″	283.2 mm	13.15″	334.4 mm	15.65″	397.5 mm
Depth			19.5″	495.3 mm	19.5″	495.3 mm	19.5″	495.3 mm	19.5″	495.3 mm
Weight (without options)			50 lb	22.7 kg	55 lb	25 kg	67 lb	30.5 kg	72 lb	32.7 kg
Electrical	General (auto-adjusting)		90–264 VAC; 48-62 Hz		90–264 VAC; 48-62 Hz		90–264 VAC; 48-62 Hz		90–264 VAC; 48-62 Hz	
	Power Consumption	Printing PAUSE test label at slowest speed	121 W		180 W		220 W		269 W	
		Printer idle	20 W		19 W		19 W		20 W	
	Compliance		Complies with FCC class "B" and Canadian Doc. class "A" rules. Carries the CE mark of compliance.							
Agency Approvals			Bi-National UL 60950 3rd edition/CSA CAN/CSA-C22.2 No. 60950-00 3rd edition; IEC 950/EN60950; EN55022:1998 Class B; EN55024: 1998; EN61000-3-2,3; Canadian ICES-003, Class B; FCC class B; Argentina 92/98 Phase 3; Australia AS/NZS 3548; R.OC. CNS 13438							
Temperature	Operating Environment	Thermal transfer	41° to 104° F 5° to 40° C							
		Direct thermal	32° to 104° F 0° to 40° C							
	Storage		–40° to 140°F –40° to 60° C							
Relative Humidity	Operating Environment		20% to 85% non-condensing							
	Storage		5% to 85% non-condensing							

Printing Specifications

Printing Specifications			90*Xi*III*Plus*	96*Xi*III*Plus*	140*Xi*III*Plus*	170*Xi*III*Plus*	220*Xi*III*Plus*
Resolution			300 dots/inch (12 dots/mm)	600 dots/inch (24 dots/mm)	203 dots/inch (8 dots/mm)	300 dots/inch (12 dots/mm)	203 dots/inch (8 dots/mm)
Dot size (width × length)			0.0033″ × 0.0039″ (0.084 mm × 0.100 mm)	0.0016″ × 0.0016″ (0.042 mm × 0.042 mm)	0.0049″ × 0.0049″ (0.125 mm × 0.125 mm)	0.0033″ × 0.0039″ (0.84 mm × 0.100 mm)	0.0049″ × 0.0049″ (0.125 mm × 0.125 mm)
First dot location measured from inside media edge			0.023″±0.035″ (0.6 mm ± 0.89 mm)	0.023″±0.035² (0.6 mm ± 0.89 mm)	0.10″±0.035″ (2.5 mm ± 0.89 mm)	0.10″±0.035″ (2.5 mm ± 0.89 mm)	0.10″±0.035″ (2.5 mm ± 0.89 mm)
Maximum print width			3.4″ (86 mm)	3.2″ (81 mm)	5.04″ (128 mm)	6.6″ (168 mm)	8.5″ (216 mm)
Selectable Print Speeds (inches per second)			2, 3, 4, 5, 6, 7, 8	1, 2, 3, 4	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	2, 3, 4, 5, 6, 7, 8	2, 3, 4, 5, 6, 7, 8, 9, 10
Print length (maximum)	Non-continuous printing	With standard 16 MB memory	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)
		With 16 MB memory expansion	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)	39″ (991 mm)
	Continuous printing	With standard 16 MB memory	100″ (2540 mm)	52″ (1321 mm)	150″ (3810 mm)	100″ (2540 mm)	150″ (3810 mm)
		With 16 MB memory expansion	100″ (2540 mm)	52″ (1321 mm)	150″ (3810 mm)	100″ (2540 mm)	150″ (3810 mm)
Bar code modulus (“X”) dimension	Ladder (rotated) orientation		3.9 mil to 39 mil	1.6 mil to 16 mil	4.9 mil to 49 mil	3.9 mil to 39 mil	4.9 mil to 49 mil
	Picket fence (non-rotated) orientation		3.33 mil to 33 mil	1.6 mil to 16 mil	4.9 mil to 49 mil	3.33 mil to 33 mil	4.9 mil to 49 mil
Thin film printhead with Element Energy Equalizer (E3)®			Yes	Yes	Yes	Yes	Yes

Ribbon Specifications

Ribbon Specifications			90XiIII*Plus*/ 96*Xi*III*Plus*	140*Xi*III*Plus*	170*Xi*III*Plus*	220*Xi*III*Plus*
Ribbon must be wound with the coated side out.						
Ribbon width *(Zebra recommends using ribbon at least as wide as the media to protect the printhead from wear.)*		Minimum	0.79″ (20 mm)	1.57″ (40 mm)	2.0″ 51 mm)	4.25″ (108 mm)
		Maximum	3.40″ (87 mm)	5.10″ (130 mm)	6.7″ 170 mm)	8.60″ (220 mm)
Standard lengths	2:1 media to ribbon roll ratio		984′ (300 m)	984′ (300 m)	984′ (300 m)	984′ (300 m)
	3:1 media to ribbon roll ratio		1476′ (450 m)	1476′ (450 m)	1476′ (450 m)	1476′ (450 m)
Ribbon core inside diameter			1.0″ (25.4 mm)	1.0″ (25.4 mm)	1.0″ (25.4 mm)	1.0″ (25.4 mm)
Maximum ribbon roll outside diameter			3.2″ (81.3 mm)	3.2″ (81.3 mm)	3.2″ (81.3 mm)	3.2″ (81.3 mm)

Media Specifications

Media Specifications			90*Xi*III*Plus*/ 96*Xi*III*Plus*	140*Xi*III*Plus*	170*Xi*III*Plus*	220*Xi*III*Plus*
Minimum label length*		Tear-off	0.7″ (18 mm)	0.7″ (18 mm)	0.7″ (18 mm)	0.7″ (18 mm)
		Peel-off	0.5″ (13 mm)	0.5″ (13 mm)	0.5″ (13 mm)	0.5″ (13 mm)
		Cutter	1.5″ (38 mm)	1.5″ (38 mm)	1.5″ (38 mm)	1.5″ (38 mm)
		Rewind	0.25″ (6 mm)	0.25″ (6 mm)	0.25″ (6 mm)	0.25″ (6 mm)
Total media width (label + liner, if any)		Minimum	0.79″ (20 mm)	1.57″ (40 mm)	2.00″ (51 mm)	4.25″ (108 mm)
		Maximum	3.54 mm (90 mm)	5.51 mm (140 mm)	7.1 mm (180 mm)	8.80 mm (224 mm)
Total thickness (includes liner, if any)		Minimum	0.003″ (0.076 mm)	0.003″ (0.076 mm)	0.003″ (0.076 mm)	0.003″ (0.076 mm)
		Maximum	0.012″ (0.305 mm)	0.012″ (0.305 mm)	0.012″ (0.305 mm)	0.012″ (0.305 mm)
Cutter maximum full-width media thickness			0.014″ (0.35 mm)	0.009″ (0.23 mm)	0.007″ (0.18 mm)	0.005″ (0.14 mm)
Roll media core inside diameter			3″ (76 mm)	3″ (76 mm)	3″ (76 mm)	3″ (76 mm)
Maximum roll diameter			8.0″ (203 mm)	8.0″ (203 mm)	8.0″ (203 mm)	8.0″ (203 mm)
Inter-label gap		Minimum	0.079″ (2 mm)	0.079″ (2 mm)	0.079″ (2 mm)	0.079″ (2 mm)
		Preferred	0.118″ (3 mm)	0.118″ (3 mm)	0.118″ (3 mm)	0.118″ (3 mm)
		Maximum	Maximum inter-label gap = 2 × (label length for which you have calibrated the printer) + 1″			
Maximum internal fanfold media pack size (label + liner) L × W × H			8.0″×4.5″×4.5″ (203 mm × 114 mm × 114 mm)	8.0″×5.5″×4.5″ (203 mm × 140 mm × 114 mm)	8.0″x7.1″x4.5″ (203 mm × 180 mm × 114 mm)	8.0″x8.8″x4.5″ (203 mm × 224 mm × 114 mm)
Ticket/tag sensing notch L × W			0.12″ × 0.25″ (3 mm) × (6 mm)	0.12″ × 0.25″ (3 mm) × (6 mm)	0.12″ × 0.25″ (3 mm) × (6 mm)	0.12″ × 0.25″ (3 mm) × (6 mm)
Ticket/tag sensing hole diameter			0.125″ (3 mm)	0.125″ (3 mm)	0.125″ (3 mm)	0.125″ (3 mm)
Effective leading edge registration accuracy*		Vertical	± 0.060″ (±1.5 mm)	± 0.070″ (±1.8 mm)	± 0.060″ (±1.5 mm)	± 0.050″ (±1.3 mm)
		Horizontal	± 0.060″ (±1.5 mm)	± 0.070″ (±1.8 mm)	± 0.060″ (±1.5 mm)	± 0.060″ (±1.5 mm)
Additional specifications for black mark sensing	Mark length (measuring parallel to label/tag edge)	Minimum	0.12″ (3 mm)	0.12″ (3 mm)	0.12″ (3 mm)	0.12″ (3 mm)
		Maximum	0.43″ (11 mm)	0.43″ (11 mm)	0.43″ (11 mm)	0.43″ (11 mm)
	Mark width (measuring to perpendicular label/tag edge)	Minimum	0.43″ (11 mm)	0.43" (11 mm)	0.43″ (11 mm)	0.43″ (11 mm)
		Maximum	Full media width	Full media width	Full media width	Full media width
	Mark location		Marks must be located within 0.040″ (1 mm) of the inside media edge.			
	Mark density		>1.0 Optical Density Unit (ODU)	>1.0 Optical Density Unit (ODU)	>1.0 Optical Density Unit (ODU)	>1.0 Optical Density Unit (ODU)
	Maximum density of the back of the media on which the black mark is printed		0.5 ODU	0.5 ODU	0.5 ODU	0.5 ODU

* Media registration and minimum label length are affected by media type and width, ribbon type, print speed, and printer mode of operation. Performance improves as these factors are optimized. Zebra recommends always qualifying any application with thorough testing.

Power Cord Specifications

- The overall length must be less than 9.8′ (3.0 m).
- It must be rated for at least 5 A, 250 V.
- The chassis ground (earth) MUST be connected to ensure safety and reduce electromagnetic interference. The ground connection is handled by the third wire (earth) in the power cord. See Figure 40.
- The AC power plug and IEC 320 connector must bear the certification mark of at least one of the known international safety organizations shown in Figure 41.

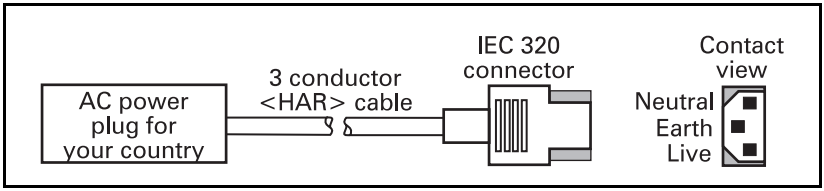


Figure 40. AC Power Cord

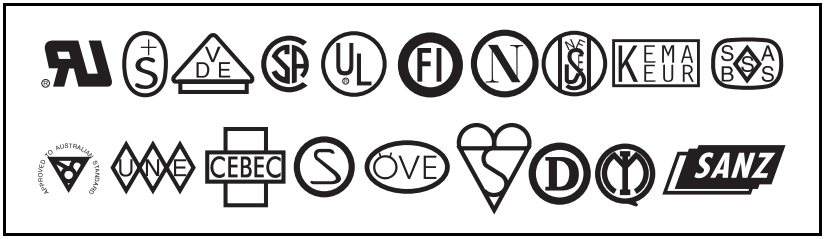


Figure 41. International Safety Organizations Symbols

Appendix

Printer Interface Technical Information

RS-232 Serial Data Port

The connection for this standard interface is made through the female DB-9 connector on the rear panel. A DB-9 to DB-25 interface module is available for all RS-232 connections through a DB-25 cable (see page 102 for details).

For all RS-232 input and output signals, the printer follows both the Electronics Industries Association's (EIA) RS-232 specifications and the Consultative Committee for International Telegraph and Telephone (CCITT) V.24 standard signal level specifications.

Table 3 shows the pin configuration and function of the rear panel serial data connector on the printer.

Table 3. Rear Panel Serial Data Connector Pin Configuration

Pin No.	Name	Description
1	—	Not connected
2	RXD	Receive data—data input to printer
3	TXD	Transmit data—data output from printer
4	DTR	Data terminal ready—output from printer
5	SG	Signal ground
6	DSR	Data set ready—input to printer
7	RTS	Request to send—output from printer
8	CTS	Clear to send—input to printer
9	+5VDC	+5VDC signal output **NOTE:** This pin is also available as a +5VDC power source at 750 mA. The maximum current draw may be limited by option configuration. To enable this capability, a jumper on the computer's main logic board needs to be installed on JP1, pins 2 and 3.

NOTE: An interface module is required for RS-422/RS-485 interface support (see page 103).

RS-232 Interface Connections

The printer is configured as Data Terminal Equipment (DTE). Figure 42 illustrates the internal connections of the printer's RS-232 connector.

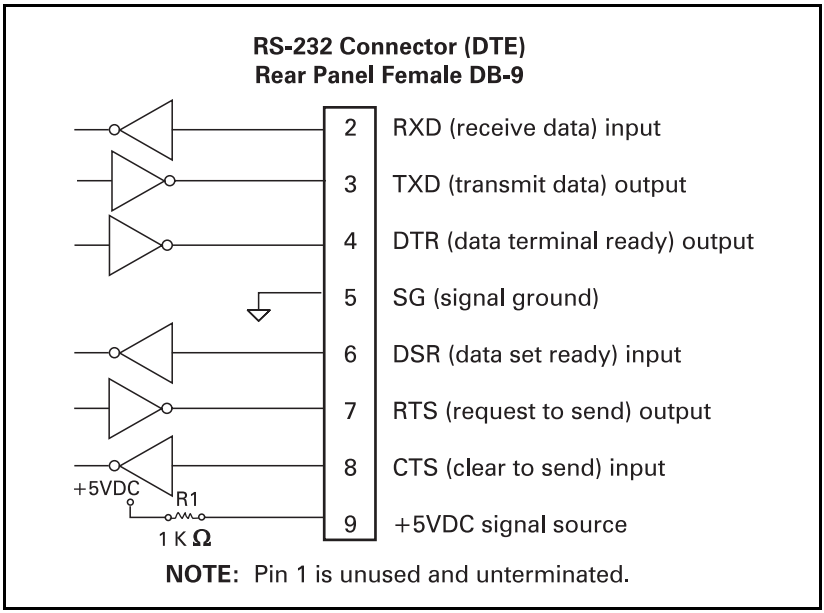


Figure 42. RS-232 to DB-9 Connections

NOTE: The cable used to connect the printer to a computer must be a null modem (crossover) cable. If you want to connect the printer to any other DTE devices, a null modem cable must also be used.

When the printer is connected via its RS-232 interface to Data Communication Equipment (DCE) such as a modem, use a standard RS-232 (straight-through) interface cable. Figure 43 illustrates the connections required for this cable.

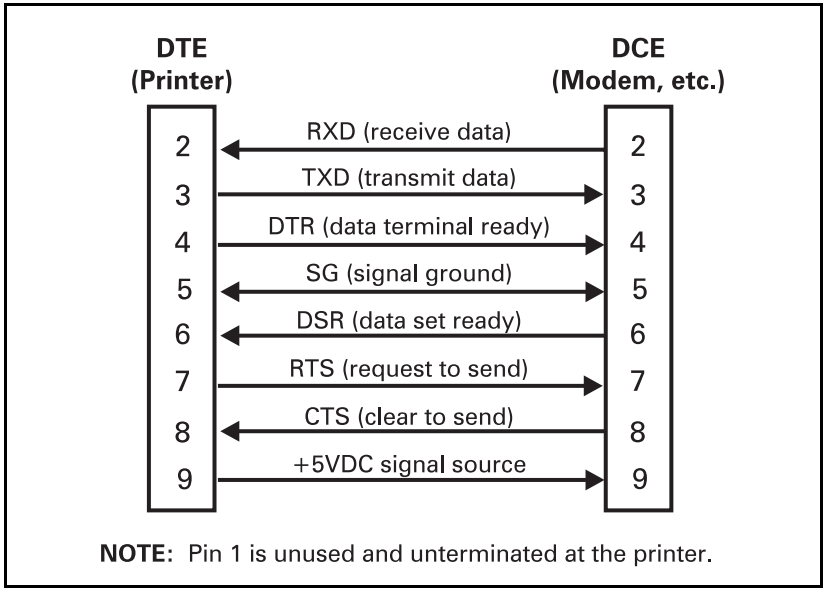


Figure 43. RS-232 Straight-Through Connections

RS-232 Interconnections Using a DB-25 Cable

In order to connect the printer's DB-9 interface to a DB-25 connector, an interface adapter is required (Zebra part # 33138). A generic DB-25 adapter may also be used, however, the +5VDC signal source would not be passed through. Figure 44 illustrates the connections required for the DB-9 to DB-25 interface.

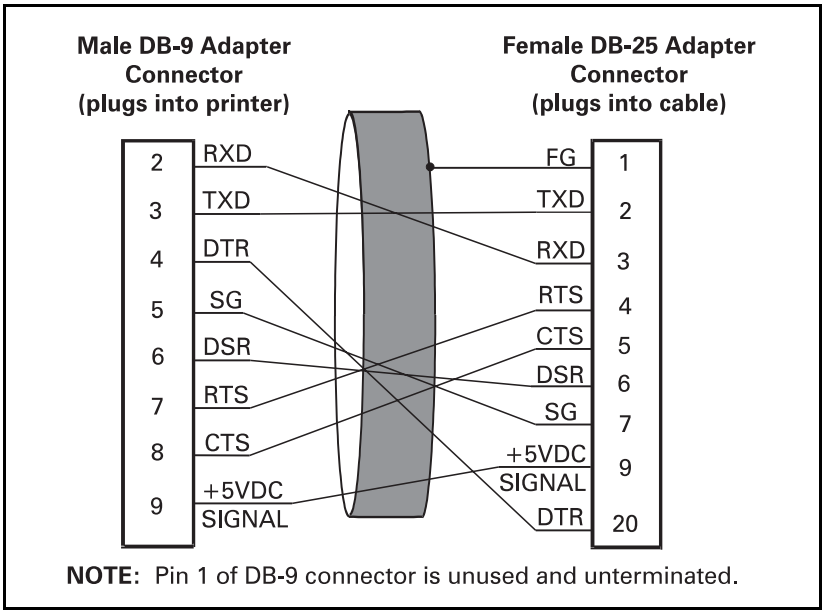


Figure 44. DB-9 to DB-25 Connections

RS-422/RS-485 Interconnections

NOTE: A jumper on the computer's main logic board needs to be installed on JP1, Pins 2 and 3, in order for the RS-422/RS-485 interface adapter to function properly.

To connect the printer's RS-232 DB-9 interface to a host computer through an RS-422 or RS-485 interface, an interface adapter is required (Zebra part # 33130). Figure 45 illustrates the required cable wiring for interconnecting to the interface adapter's DB-25 female connector.

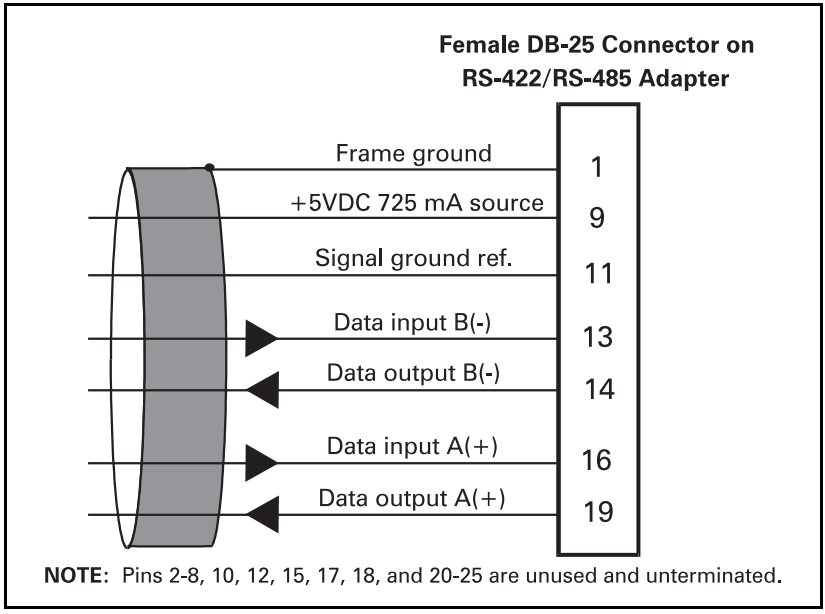


Figure 45. RS-422/RS-485 Connections

Parallel Data Port

A standard 36-pin parallel connector is available at the rear of the printer for connection to the data source. Under normal circumstances, data sent from the printer to the host computer in response to a "Printer Status Request" command is sent through the RS-232 serial port. However, if the host computer has a properly configured IEEE-1284 parallel port that is recognized by the printer, status information is returned through the parallel port. Port selection for status information is determined each time the printer is turned on.

Parallel Port Interconnections

Table 4 shows the pin configuration and function of a standard computer-to-printer parallel cable.

Table 4. Parallel Port Pin Configuration

36-pin Connector	Description
1	nStrobe/HostClk
2–9	Data Bits 1–8
10	nACK/PtrClk
11	Busy/PtrBusy
12	PError/ACKDataReq
13	Select/Xflag
14	nAutoFd/HostBusy
15	Not used
16 & 17	Ground
18	+5V @ 750 mA **NOTE:** The maximum current draw may be limited by option configuration.
19–30	Ground
31	ninit
32	nFault/NDataAvail
33 & 34	Not used
35	+5V through a 1.8KΩ Resistor
36	NSelectin/1284 active

Memory Cards

PCMCIA Card

To install the Type I or Type II compliant PCMCIA card, refer to Figure 46 and perform the following procedure:

WARNING: The printer electronics are susceptible to static discharge. Before proceeding, ground yourself to the printer to remove any existing static.

NOTE: The PCMCIA card is hot-swappable (it can be installed while the printer is ON).

1. Remove the PCMCIA card shield from the rear of the printer.
2. Insert the PCMCIA card, with the notch UP, into the card slot as shown. (Insert far enough to cause the eject button to pop out.)
3. Reinstall the PCMCIA card shield over the PCMCIA card and card slot.

The printer is now ready to operate with the additional memory or font option.

NOTE: Initialization of the PCMCIA card may take a few minutes; the PAUSE LED flashes while the card initializes. If the card is already initialized, the PAUSE LED flashes only once or twice. To verify that the card has successfully initialized, print a configuration label and review it to see if the new memory card information is listed.

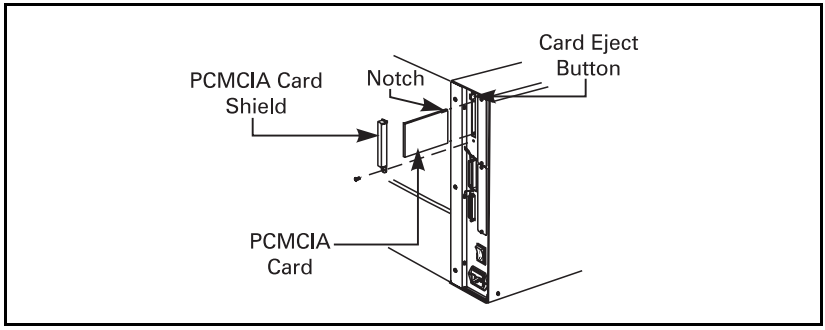


Figure 46. PCMCIA Card Installation

CompactFlash Card

To install the Type I compliant CompactFlash card, perform the following procedure:

WARNING: The printer electronics are susceptible to static discharge. Before proceeding, ground yourself to the printer to remove any existing static.

1. Turn the AC power OFF and disconnect the AC power cord from the printer.
2. Refer to Figure 47. Remove the electronics cover by removing the two screws located near the bottom. Lift the electronics cover at the rear top corner as shown and pull the corner forward and up, then lift the cover up and away from the printer.

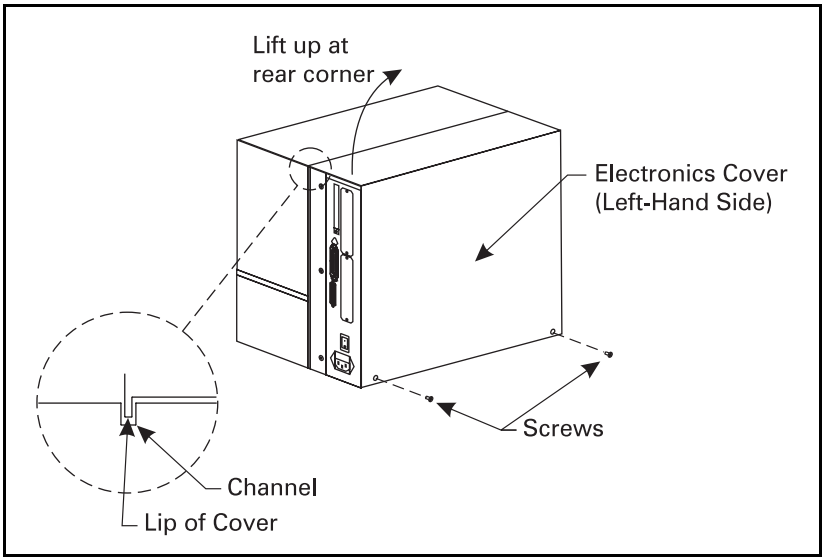


Figure 47. Electronics Cover Removal

3. Refer to Figure 48. Insert the CompactFlash card into the card slot located on the upper portion of the option board—the card can only be inserted one way and should “snap” into place.

NOTE: The CompactFlash card should be inserted with the *back side of the card facing out*.

4. Reinstall the electronics cover by lowering the cover so the lip goes into the channel on the top of the printer (see Figure 47). Secure the cover by reinstalling the two screws on the bottom of the cover.
5. Reconnect the printer AC power cord.
6. Press and hold the FEED key while turning the printer ON.
7. Verify the presence of additional memory or optional fonts by checking the information on the configuration label printed during the power-on sequence.

The printer is now ready to operate with the additional memory or font option.

NOTE: Initialization of the CompactFlash card may take a few minutes; if the process isn’t successfully completed within 10 minutes, contact Zebra Technical Support for assistance.

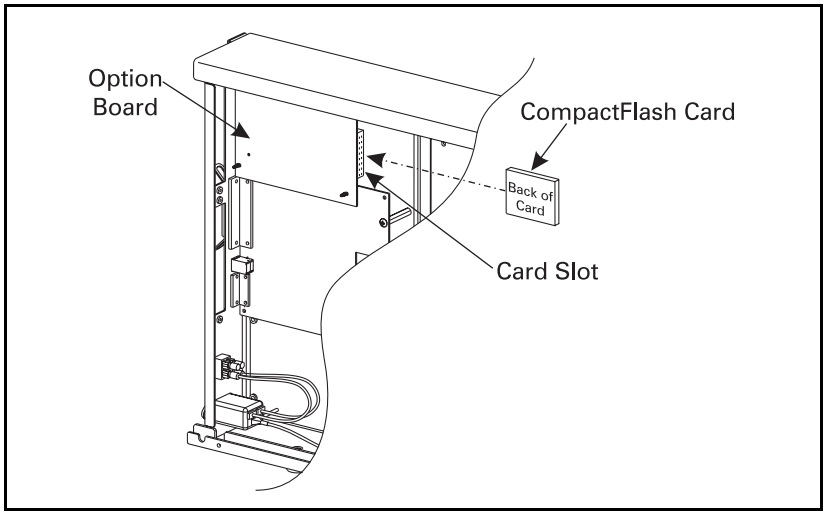


Figure 48. CompactFlash Card Installation

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Warranty Information

Effective November 1, 2001

All Zebra products are sold with warranties. Following is some general information:

Printer Products

Printers. All printers (excluding printheads) are warranted against defect in material or workmanship for twelve (12) months from the purchase date.

Proof of purchase or shipment date is required to validate the warranty period. The warranty becomes void if the equipment is modified, improperly installed or used, damaged by accident or neglect, or if any parts are improperly installed or replaced by the user.

NOTE: Products returned must be packaged in the original or comparable packing and shipping container. In the event equipment is not so packaged, or if shipping damage is evident, it will not be accepted for service under warranty. Surface transportation charges for return to customers in the continental United States is paid by Zebra. Otherwise, Zebra pays CPT (carriage paid to) nearest airport; customer pays customs, duties, taxes, and freight from airport to destination. If Zebra determines that the product returned for warranty service or replacement is not defective as herein defined, the customer will pay all handling and transportation costs.

Printheads. Since printhead wear is part of normal operation, the original printhead is covered by a limited warranty as indicated below. Warranty period begins on purchase date.

Printhead	Warranty Period
Bar code label printer printheads	6 months
Card printer printheads	12 months

To qualify for this warranty, the printhead must be returned to the factory or to an authorized service center. Customers are not required to purchase Zebra supplies (media and/or ribbons) for warranty qualification. However, if it is determined that the use of other manufacturer supplies has caused any defect in the printhead for which a warranty claim is made, the user is responsible for Zebra's labor and material charges required to repair the defect. The warranty becomes void if the printhead is physically worn or damaged; also if it is determined that failure to follow the preventive maintenance schedule listed in the User's Guide has caused defect in the thermal printhead for which a warranty claim is made.

Software. Software is warranted to be free of defects in material and workmanship for 30 days from the date of purchase. In the event of notification within the warranty period of defects, Zebra will replace the defective diskette or documentation.

Batteries. Mobile printer batteries are warranted to be free of defects in material and workmanship for 90 days from date of purchase. In the event of notification within the warranty period, Zebra will replace the defective battery provided there has not been damage resulting from user abuse.

Parts. All parts, maintenance kits, options kits, and accessories are warranted to be free of defects in material and workmanship for 90 days (except where otherwise noted) from date of purchase. This warranty becomes void if the item is modified, improperly installed or used, or damaged by accident or neglect.

Supplies Products

Supplies are warranted to be free from defect in material and workmanship for a period of six (6) months for media and twelve (12) months for ribbon from the date of shipment by Zebra. This is provided the user has complied with storage guidelines, handling, and usage of the supplies in Zebra printers.

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    Zebra Technologies
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